BLM LIBRARY
88018434

WHITE SANDS RESOURCE AREA

DRAFT

RESOURCE MANAGEMENT PLAN

ENVIRONMENTAL IMPACT STATEMENT

US DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
LAS CRUCES DISTRICT OFFICE
NEW MEXICO

MARCH 1985

NOTICE

THIS DRAFT RESOURCE MANAGEMENT PLAN/ENVIRONMENTAL IMPACT STATEMENT (RMP/EIS) SHOULD BE RETAINED TO BE USED IN CONJUNCTION WITH THE FINAL RMP/EIS. IF CHANGES RESULTING FROM PUBLIC REVIEW AND COMMENT ON THIS DRAFT ARE RELATIVELY MINOR, THE FINAL STATEMENT WILL NOT REPRODUCE THE DRAFT TEXT IN FULL; HOWEVER, THE FINAL STATEMENT WILL INCLUDE THE MODIFICATIONS AND CORRECTIONS WHICH SHOULD BE MADE TO THIS DRAFT AS A RESULT OF PUBLIC COMMENT, AS WELL AS A RECORD OF PUBLIC COMMENTS ON THIS DRAFT AND THE RESPONSES TO THOSE COMMENTS.

BLM-NM-PT-85-003-4410

IN REPLY REFER TO:

United States Department of the Interior

1600

BUREAU OF LAND MANAGEMENT
LAS CRUCES DISTRICT OFFICE
P.O. Box 1420
Las Cruces, New Mexico 88001

March 1985

Dear Reader:

Enclosed for your review and comment is the Draft White Sands Resource Management Plan/Environmental Impact Statement (RMP/EIS). This document outlines five alternative plans for managing the public land in the White Sands Resource Area in Otero and Sierra Counties, New Mexico. Alternative I was selected as the preferred alternative. The purpose of this RMP/EIS is to disclose in advance the probable environmental impacts of the alternative plans and to ensure that these factors are considered in the decision-making process.

Public meetings will be held at 10:00 a.m. and public hearings at 1:30 p.m. on ~~March 27 and 28~~, 1985. Public meetings and hearings will be held in Truth or Consequences, New Mexico on ~~March 27~~ at the Convention Center, corner of Daniels and McAdoo, and in Alamogordo, New Mexico on ~~March 28~~, 1985 at the Media Center of the School for the Visually Handicapped, 1900 North White Sands Boulevard.

We would appreciate your comments on the environmental impacts of the alternative plans. Questions or comments should be directed to:

Larry Nunez, Area Manager
White Sands Resource Area
1800 Marquess Street
P. O. Box 1420
Las Cruces, New Mexico 88004

NEW DATES
APR 16 1985 ALAMOGORDO NM
APR 17 1985 T OR C NM

Sincerely yours,

Daniel C. B. Rathbun
District Manager

#11934465
D88018434

QH
76.5
.N6
W547
1985

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

BLM LIBRARY
SC-324A, BLDG. 50
DENVER FEDERAL CENTER
P. O. BOX 25047
DENVER, CO 80225-0047

DRAFT
WHITE SANDS RESOURCE AREA
RESOURCE MANAGEMENT PLAN/ENVIRONMENTAL IMPACT STATEMENT

The Bureau of Land Management proposes to implement a multiple use Resource Management Plan on 1.8 million acres of public land in the White Sands Resource Area in Otero and Sierra Counties in south-central New Mexico. The Draft Resource Management Plan/Environmental Impact Statement (RMP/EIS) focuses on four issues: Rangeland Management, Special Management Areas, Land Tenure Adjustment, and Access. Five alternative plans are considered in detail in the RMP/EIS: a balanced alternative, a production-oriented alternative, a protection-oriented alternative, a no action alternative, and a no livestock grazing alternative. The document describes the affected environment and the environmental consequences which would result from the implementation of each alternative.

Type of Action: (x) Administrative ( ) Legislative

For Further Information Contact: Larry Nunez, Area Manager
White Sands Resource Area
1800 Marquess Street
P. O. Box 1420
Las Cruces, New Mexico 88004

Telephone: Commercial: (505) 525-8228
FTS: 571-8353

Comments Have Been Requested From: See Chapter 5

Date Draft Filed with Environmental Protection Agency: FEB 21 1985

Date on Which Comments are Due: 29 MAY 1985

Recommended:

District Manager
Las Cruces District Office
Las Cruces, New Mexico

Approved:

State Director, New Mexico

BLM LIBRARY
SC-324A, BLDG. 50
DENVER FEDERAL CENTER
P. O. BOX 25047
DENVER, CO 80225-0047

SUMMARY

SUMMARY

The Draft White Sands Resource Management Plan (RMP) and Environmental Impact Statement (EIS) explores future management options for the White Sands Resource Area (WSRA). When completed, it will provide a framework for managing and allocating land and resources on 1.8 million acres of public land in Otero and Sierra Counties, New Mexico.

The RMP/EIS deals with four issues: Rangeland Management, Special Management Areas, Land Tenure Adjustment, and Access; and examines five alternatives:

Alternative I -- Balanced
Alternative II -- Production
Alternative III -- Protection
Alternative IV -- No Action
Alternative V -- No Livestock Grazing

ALTERNATIVE I -- BALANCED

The Balanced Alternative objective is to provide a combination of harmonious but diverse resource uses throughout the Resource Area. This alternative provides for the production of needed goods and services while protecting important and sensitive environmental values. The environmental consequences were analyzed and this alternative was selected as the preferred alternative.

Major Components

Under the Balanced Alternative, livestock grazing systems would be implemented on Category I allotments. Forage production would be increased in the long-term through chemical vegetation treatments on 58,742 acres. In addition, 2,381 acres of prescribed burning and 1,597 acres of seeding are proposed. In the long-term, projected livestock forage would be 181,864 animal unit months (AUMs). Construction of rangeland developments in the short-term would include pipelines, fences, wells with pumps or windmills, storage tanks, drinking troughs, earthen stock tanks, and a catchment. Watershed values on 62,586 acres of rangeland would be improved. Off-road vehicle (ORV) use on this same acreage would be limited to existing roads and trails. Forage would be provided for 12,588 mule deer and 1,666 pronghorn while the wild burro herd would be maintained at 12 animals.

All land not limited or closed to ORV use would be designated as open. This would encompass 1,668,529 acres in the two-county area. At the same time, several areas would be designated as Special Management Areas. Improvement and protection of 320 acres in the Percha Creek riparian area

would be accomplished by fencing to eliminate livestock grazing and limiting ORV use to existing roads and trails. Forty-acre study plot exclosures typifying each of the forty-one range sites and the one pseudoriparian Standard Habitat Site (SHS) would be fenced and closed to ORV use. In the Sacramento Escarpment, 3,640 acres would be designated as an Area of Critical Environmental Concern (ACEC) for visual resources. In addition to the existing 3,270 acres designated No Surface Occupancy (NSO), an additional 370 acres would be designated NSO. ORV use would be limited to existing roads and trails. To improve and protect 1,160 acres of Lake Holloman and adjacent lands, livestock grazing would be eliminated. On 15,490 acres of the Cornudas Mountains, ORV use would be limited to existing roads and trails.

In an effort to preserve and protect various cultural resources within the Resource Area, ORV use and surface occupancy would be limited or curtailed at specific sites. At the 960-acre Three Rivers Petroglyph Site and Picnic Area, ORV use would be limited to existing roads and trails. In the Rattlesnake Hill archaeological district, 640 acres would be closed to ORV use. A total of 200 acres of the Alamo Mountain petroglyph area would be designated NSO and closed to ORV use. In the Lone Butte area, ORV use would be limited to existing roads and trails on 100 acres while 120 acres of the Jarilla Mountains would be closed to ORV use. Major surface-disturbing activities would be limited to within 1/4 mile from each side of well-preserved segments of the Butterfield and Jornada del Muerto Trails.

Approximately 45,000 acres of public land within the Resource Area would be considered for land tenure adjustment including isolated and difficult to manage parcels, lands needed for community expansion, and lands where interest has been shown. To provide additional legal access to public land, 238 miles of new roads would be constructed while 36 miles of easements would be acquired.

Environmental Consequences

Access

By constructing new roads or acquiring easements across non-Federal existing roads, access to public land would be guaranteed, resulting in fewer user complaints (of lack of access to public land) and an increase in the efficiency of managing public land.

Lands

Under the Balanced Alternative, impacts to lands would be significant due to the loss of 45,000 acres. However, this would only represent 2.5 percent of the total BLM acreage managed in the Resource Area.

Geology and Minerals

Designation of Special Management Areas in areas of moderate to high mineral potential could significantly affect mineral exploration and development.

Soils

Wind and water erosion would decrease slightly in the long-term on the 61,123 acres where vegetation has been chemically treated or burned. Sediment yields would decrease on the 62,586 acres of rangeland proposed for watershed treatments. Soils would be disturbed on approximately 194 acres in the short-term and 40 acres in the long-term following construction of new rangeland developments. Concentration of livestock around new water facilities would compact medium and fine textured soils. In areas not closed to ORVs, medium and fine textured soils would be susceptible to compaction and the formation of ruts, especially when wet. On steep slopes, soils would be susceptible to accelerated erosion where soil structure is altered by unrestrained ORV use. Approximately 576 acres of soils would be disturbed during the construction of new roads.

Water Resources

Peak runoff rates would increase slightly in the short-term on the 58,742 acres chemically treated for brush control. In the long-term, however, runoff rates would decrease an average of 15 percent on key range sites. Surface water contamination from herbicide application would not be significant due to stipulations calling for buffer strips and carefully controlled application near surface water impoundments. Contamination of ground waters would be remote because of very slow rates of movement in the soil and rapid biological and photo detoxification.

Long-term water depletion by livestock, wildlife, and earthen stock tank evaporation would be approximately 450 acre-feet per year.

Watershed treatments on 62,586 acres would include both structural and land treatment measures to address the problems of flood and sediment damages. Primary objectives of the treatments would include a reduction in peak runoff rates, a reduction in sediment yields, improved water quality, and better on-site utilization of runoff water.

The fencing of the riparian area along Percha Creek to eliminate ORV and livestock use would slightly improve channel stability along the protected portion of the stream in the long-term.

Vegetation

Acres in excellent, good, and fair ecological condition and good forage value classes, as well as vegetation ground cover, would increase in the long-term. Acreage in poor ecological condition and fair and poor forage value classes would decrease in the long-term. Acreage changes would be a result of proposed vegetation treatments, grazing management treatments, and rangeland developments. Desirable and intermediate forage species production would increase three to four times on chemically treated areas.

Livestock Grazing

There would be an increase of 6,017 AUMs on 18 allotments as a result of proposed vegetation treatments on 58,742 acres of public land. In

the long-term, there would be an increase in AUMs of 22 percent above preference on Category I allotments as a result of proposed vegetation treatments, grazing management treatments, and rangeland developments. Category M and C allotments would maintain their present 5-year average licensed use of 9,183 AUMs in the short- and long-term. These allotments could be grazed to their preference of 10,182 AUMs.

Livestock AUM reductions for allotments in all categories would be 22 percent below preference in the short-term and an increase of 23 percent above preference in the long-term. Under the worst-case situation, Category I allotments would be reduced 21 percent below preference in the short-term. These AUMs would be held in suspended preference.

Wild Burros

The wild burro herd would be managed at approximately 12 head and excess animals would be made available under the Adopt-A-Horse Program.

Wildlife

Twenty percent of SHS acres would increase to the next higher ecological condition. Increasing ecological condition would promote desirable shrub-type browse species by about 12 percent. There would be a 48 percent increase in demand for big game (deer and pronghorn) AUMs. Improving the ecological condition and protection of the riparian habitat along the Percha Creek and Lake Holloman would benefit waterfowl, deer, and riparian habitat-associated species.

Impacts of land tenure adjustment on wildlife and habitat depends upon subsequent land use, which is unknown. At worst, about 45,000 acres of various habitat types would be lost, including habitat for an estimated 158 deer. The impacts from new road construction could eliminate a small percentage of various habitat types, increase disturbance of big game if roads are located near the pseudoriparian SHS, and have an insignificant impact on the more important habitat types which occur in smaller acreages, if they are avoided in final route selection.

Recreation

New vehicular access would result in improved recreational access and could result in increased interaction between recreational and nonrecreational users. Existing recreation values in the Sacramento Escarpment and Three Rivers Petroglyph Site and Picnic Area would be protected.

Visual Resources

Visual contrasts would occur and would result in moderate long-term impacts on the area's visual quality.

Wilderness

The natural quality of the Brokeoff Mountains Wilderness Study Area (WSA) and the former Little Dog Canyon WSA would be reduced by proposed rangeland improvements.

Cultural Resources

Trampling, rangeland improvements, land tenure adjustments, and additional access could impact cultural resources by damaging sites, transferring sites out of Federal control, or increasing disturbance to sites. Limiting ORV use, improving erosion conditions, and fencing would protect sites.

Social and Economic Conditions

In the short-term, there would be a decrease of approximately 8.5 percent in AUMs from the 5-year average. Total receipts from ranching would decline by approximately $341,902. Hired ranch labor would decline to 27 jobs from an estimated 29 existing jobs. This would account for a decrease in wages and salaries paid by $12,719. Total employment would decline by 5 jobs with employee compensation declining by $49,000 in the Resource Area economy. Approximately $2.6 million would be expended for rangeland improvements. The Resource Area economy would experience an estimated increase in employment of approximately 50 jobs and an increase in employee compensation of approximately $621,000. The social values of living in the area would not change. Those individuals associated with the ranching way of life would continue to maintain their identity as such.

In the long-term, total receipts would increase to just under $4.4 million. Hired ranch labor would increase by 16 jobs and increase salaries paid to ranch hands by an estimated $111,587. Total employment in the Resource Area is estimated to increase by 16 jobs and employee compensation would increase by $153,469. The social values, attitudes, and beliefs in the Resource Area would be reinforced and would be favorable for those who have the identity and role of "rancher." The 45,000 acres identified for land tenure adjustment have an estimated value for analysis purposes of approximately $4.5 million. If these lands are sold, they could add $1.5 million to the total assessed valuation of the Resource Area economy. Estimated potential tax revenues could amount to $24,000 with payments in lieu of taxes not affecting the Resource Area economy. Construction and maintenance of 238 miles of new roads would inject $6.2 million into the economy.

ALTERNATIVE II -- PRODUCTION

The Production Alternative objective is to emphasize making public land and resources available for use and development. Environmental values would be protected to the extent required by applicable laws, regulations, and policies; however, livestock forage production and land disposal would be favored.

Major Components

Under the Production Alternative, livestock grazing systems would be implemented on all allotments with the exception of Section 15 allotments. Livestock forage would increase to 191,003 AUMs in the long-term. Forage production would be increased in the long-term through chemical vegetation treatment on 145,115 acres. In addition, 2,381 acres of prescribed burning and 1,597 acres of seeding are proposed. Construction of rangeland developments in the short-term would include: pipelines, fences, wells with pumps or windmills, several 20,000-gallon storage tanks, drinking troughs, earthen stock tanks, and one catchment. Watershed values on 62,586 acres of rangeland would be improved. Forage would be provided for 5,955 mule deer and 731 pronghorn while the wild burro herd would be removed and made available for adoption.

Three 40-acre study plot exclosures would be fenced to typify each of the three life zones. Under this alternative, all public land within the Resource Area would be designated open to ORV use.

Under the Production Alternative, 58,000 acres of public land would be considered for land tenure adjustment. This acreage would include isolated and difficult to manage parcels, lands needed for community expansion, and lands where an interest has been shown. To provide additional legal access to public land in the two-county area, 422 miles of new roads would be constructed and 66 miles of easements would be acquired.

Environmental Consequences

Access

By constructing new roads or acquiring easements across non-Federal existing roads, access to public land would be guaranteed, resulting in fewer user complaints (of lack of access to public land) and an increase in the efficiency of managing public land.

Lands

Under the Production Alternative, BLM acreage would decrease by 3.25 percent.

Soils

Soils would be disturbed on approximately 215 acres in the short-term and 42 acres in the long-term following construction of new rangeland developments. Medium and fine textured soils would be susceptible to increased soil compaction where livestock concentrate around new water facilities. There would be a slight decrease in soil loss on the 145,115 acres chemically treated for brush control. Erosion condition would improve on the 62,586 acres of rangeland proposed for watershed treatments.

Medium and fine textured soils would be susceptible to compaction and the formation of ruts by ORVs. On steep slopes, soils would be

susceptible to accelerated erosion where soil structure is altered by unobstructed ORV use. Approximately 1,021 acres of soils would be disturbed during the construction of new roads.

Water Resources

Peak runoff rates would increase slightly in the short-term on the 145,115 acres chemically treated for brush control. In the long-term, runoff rates would decrease an average of 17 percent on key range sites. Surface water contamination from herbicide application would not be significant due to stipulations calling for buffer strips and carefully controlled application near surface water impoundments. There would be a higher potential for surface water contamination, however, because of the large number of acres proposed for treatments. Contamination of ground water would be remote because of rapid biological and photo detoxification of the herbicides and very slow rates of movement in the soil.

Long-term water depletion by livestock, wildlife, and earthen stock tank evaporation would be approximately 462 acre-feet per year.

Watershed improvements on 62,586 acres would include both structural and land treatment measures to address the problems of flood and sediment damages. Primary objectives of the treatments would include reducing peak runoff rates, reducing sediment yields, improving water quality, and better on-site utilization of runoff water.

Vegetation

Vegetation would be disturbed or destroyed on 215 acres in the short-term and destroyed on 42 acres in the long-term as a result of construction of rangeland developments. Acreage in excellent, good, and fair ecological condition would increase, with acreage in poor ecological condition decreasing in the long-term. Acreage in good and fair forage value classes would increase, with acreage in poor decreasing in the long-term. Acreage changes would be a result of proposed vegetation treatments, grazing management treatments, and rangeland developments. Vegetation ground cover would increase in the long-term with desirable and intermediate forage species increasing three to four times on chemically-treated areas and at least four times on reseeded areas.

Livestock Grazing

An increase of 12,417 AUMs would occur on 45 allotments as a result of chemical vegetation treatments on 145,115 acres in the long-term. Under the worst-case situation, livestock grazing would be reduced 22 percent from preference in the short-term. In the long-term, there would be an increase in AUMs of 29 percent above preference.

Wild Burros

In the short- and long-term, wild burros would be removed from the natural ecological system and would not be available for public viewing.

Wildlife

Most SHS acres would improve to fair ecological condition under this alternative and a high percentage of acres would improve to good ecological condition. It is assumed that an increase in grass and a decrease in shrubs should result in an increase in both plant and animal diversity. Forage would be provided for the present numbers of big game with no provisions for population increases in both the short- and long-term.

Habitat loss would occur near population centers as a result of open ORV designations. The construction of 422 miles of road would eliminate 1,021 acres of various habitat sites. Big game could be affected in the long-term depending on the amount and type of use on the proposed roads. Factors detrimental to big game could also increase with new access, including animal-vehicle accidents and poaching.

Recreation

New vehicle access would result in improved recreational access and could result in increased interaction between recreational and nonrecreational users. The transfer of some lands into non-Federal ownership could affect the availability of some recreation opportunities to the general public.

Visual Resources

Visual contrasts would occur and would result in moderate long-term impacts to the area's visual quality.

Wilderness

The natural quality of the Brokeoff Mountains WSA and the former Little Dog Canyon WSA would be reduced by proposed rangeland improvements.

Cultural Resources

Trampling, rangeland improvements, land tenure adjustments, additional access, and open ORV designations could impact cultural resources by damaging sites, transferring sites out of Federal control, or increasing disturbance to sites.

Social and Economic Conditions

In the short-term, there would be an 8.5 percent reduction in livestock grazing from current levels (5-year average). Total receipts from ranching would decline by $341,902. Hired ranch labor would decline by 2 jobs. Total employment would decline by 5 jobs with employee compensation declining by approximately $49,000 in the Resource Area economy. Approximately $5 million would be expended for rangeland improvements. Employment levels in the Resource Area economy would increase by 98 jobs with an increase in employee compensation of $1.2 million.

In the long-term, there would be an overall increase in AUMs for total operations of approximately 28 percent from existing levels. Total receipts from ranching would increase by an estimated $1.1 million. Hired ranch labor would increase by an estimated 17 jobs with a corresponding increase in employee compensation of $117,243. The lifestyles within the small communities, particularly the ranching lifestyle, would be ensured. The aspects which make the area an attractive place to live would not be significantly altered. If the 58,000 acres identified for land tenure adjustment are sold to private parties, the private ownership in the Resource Area would increase by 6.4 percent. If this occurred, estimated assessed valuation would be approximately $1.9 million and tax revenues would be approximately $30,971. Payments in lieu of taxes would not affect the Resource Area economy. The construction and maintenance of 422 miles of new roads would inject $8.6 million into the economy.

ALTERNATIVE III -- PROTECTION

The Protection Alternative objective is to emphasize maintaining or improving environmental values. Resource use and development would be permitted to the extent compatible with the environmental protection emphasis.

Major Components

Under the Protection Alternative, livestock forage would be reduced in the short-term including a 50 percent reduction in livestock use on 413,005 acres in poor ecological condition and a 25 percent reduction on 386,596 acres in fair ecological condition. In the long-term, projected livestock forage would be 130,115 AUMs. Construction of rangeland developments would include fences, pipelines, wells with pumps or windmills, several 20,000-gallon storage tanks, drinking troughs, earthen stock tanks, and one catchment. Watershed values would be improved on 73,601 acres of rangeland, while ORV use would be limited to existing roads and trails on the same 73,601 acres of rangeland. Forage would be provided for 12,588 mule deer and 1,666 pronghorn while the wild burro herd would be increased to 50 animals.

ORV use would be limited on 116,000 acres of McGregor Range north of State Road 506. Public land not designated as limited or closed to ORV use would be designated open. Approximately 320 acres of the Percha Creek riparian area would be fenced to eliminate livestock grazing, closed to ORV use, and designated NSO. A total of 92 40-acre study plot exclosures typifying each of the range sites and the pseudoriparian SHS in each ecological condition class represented would be fenced, closed to ORV use, and designated NSO. At Lake Holloman, 2,520 acres would be improved and protected while 1,360 acres would be fenced. In the Sacramento Escarpment area, 4,300 acres would be designated as an ACEC for visual resources. The ACEC would be closed to ORV use, withdrawn from locatable mineral entry, and an additional 1,000 acres designated NSO (in addition to the existing 3,300 acres designated NSO). ORV use would be limited to existing roads and trails on 15,490 acres of the Cornudas mountains, 7,799 acres of the Brokeoff Mountains, and 6,160 acres of the Cuchillo Mountains.

At the Three Rivers Petroglyph Site and Picnic Area, ORV use would be limited on 960 acres. An additional 740 acres would be fenced to eliminate livestock grazing on the 960-acre total area. The Rattlesnake Hill archaeologic district (640 acres) and the Alamo Mountain petroglyph area (340 acres) would be closed to ORV use and closed to future rangeland improvements. In addition, Alamo Mountain would be designated NSO. On 320 acres of the Lone Butte area, ORV use would be limited to existing roads and trails. In the Jarilla Mountains, 320 acres would be closed to ORV use.

Along well-preserved segments of the Butterfield and Jornada del Muerto Trails, major surface disturbance activities would be limited to within 1/4 mile of each side. This would encompass total of 3,472 acres.

A total of 177,000 acres of public land would be considered for land tenure adjustment. This acreage would include those lands needed for community expansion, lands where an interest for disposal has been shown, potential exchange lands, and potential acquisition lands. Additional access would be provided to public land by constructing 135 miles of new roads and acquiring 30 miles of easements.

Environmental Consequences

Access

By constructing new roads or acquiring easements across non-Federal existing roads, access to public land would be guaranteed, resulting in fewer user complaints (of lack of access to public land) and an increase in the efficiency of managing public land.

Lands

Under the Protection Alternative, 8.5 percent of the public land in the Resource Area would no longer be available to BLM management. At the same time, up to 23,000 acres (1.25 percent) would be acquired (mostly for watershed).

Geology and Minerals

Impacts to mineral exploration and development from the designation of Special Management Areas in areas of moderate to high mineral potential could be significant.

Soils

Under the Protection Alternative, soils would be disturbed on approximately 196 acres in the short-term and 38 acres in the long-term following construction of new rangeland developments. Concentration of livestock around new water facilities would disturb and compact medium and fine textured soils. Erosion condition would be improved where watershed treatments occur. Approximately 73,601 acres would be considered for watershed treatments.

On the 1,524,355 acres open to ORVs, medium and fine textured soils would be susceptible to compaction and the formation of ruts, especially when wet. On steep slopes, soils would be susceptible to accelerated erosion when soil structure is altered by unobstructed ORV use. Approximately 327 acres of soils would be disturbed during the construction of new roads.

Water Resources

Improved ecological condition and increased ground cover would decrease peak runoff rates an average of 14 percent in the long-term.

Water depletion by livestock, wildlife, and earthen stock tank evaporation would be approximately 390 acre-feet per year.

Watershed improvements on 73,601 acres would include both structural and land treatment measures to address the problems of flood and sediment damages. Primary objectives of the treatments would include reducing peak runoff rates, reducing sediment yields, improving water quality, and better on-site utilization of runoff water.

The fencing of the riparian area along Percha Creek to eliminate livestock use would improve channel stability of the stream in the long-term.

Vegetation

Short-term consumption of forage would be reduced approximately 10 percent from the 5-year average. Vegetation would be disturbed or destroyed on 196 acres in the short-term and destroyed on 38 acres in the long-term by construction of rangeland developments. Vegetation would improve on areas eliminated from livestock grazing for riparian habitat. Ground cover would increase in the long-term. Acreage in excellent, good, and fair ecological condition and good forage value class would increase in the long-term. Acreage in poor ecological condition and fair and poor forage value classes would decrease in the long-term. Acreage changes would be a result of proposed grazing management treatments, rangeland developments, and reduction in livestock numbers.

Livestock Grazing

Under the worst case situation, livestock grazing use would be reduced 29 percent below preference in the short-term. In the long-term, there would be a 12 percent decrease in AUMs below preference.

Wild Burros

In the long-term, 38 burros would be relocated to supplement the existing 12.

Wildlife

Changes in ecological condition for the SHS's would vary from 46 percent of the acres in the mesquite rolling upland to only a slight change from the mesquite sand dune SHS, improving by one ecological condition class. Increases from 10 pounds per acre to 18 pounds per acre of browse production as a result of the change in the ecological condition in the short-term would be sufficient for an optimum population of big game. However, production of preferred browse species would not be sufficient in the long-term.

If the ecological condition is improved, scaled quail habitat would improve which would provide for an increase in the population. Improvement of the ecological condition would result from the fencing of the riparian habitat along Percha Creek. Increase in food production for waterfowl would result from the fencing of the Lake Holloman area. Loss of abundant habitat types to BLM management would be insignificant, except riparian habitat. Less than 1 percent of the acreage in the Resource Area incorporates the riparian habitat. Public land would be lost to BLM management for the riparian habitat as well as a significant amount of pseudoriparian habitat, 300 deer, and 59 pronghorn, including the Nutt pronghorn herd unit.

Recreation

New vehicular access would result in insignificant improved recreational access and could result in a slight increase of interaction between recreational and nonrecreational users. Existing recreational values of the Sacramento Escarpment and the Three Rivers Petroglyph Site would be protected.

Visual Resources

Visual contrasts would occur and would result in moderate long-term impacts to the area's visual quality.

Cultural Resources

Land tenure adjustments and additional access could impact cultural resources by transferring sites out of Federal control or increasing disturbance to sites. Reducing trampling, improving erosion condition, fencing, and limiting ORV use would protect sites.

Social and Economic Conditions

In the short-term, ranching as a lifestyle in general would be threatened. Total receipts for all operations would decline by 15 percent. Returns to operator labor, management, and capital would decline by approximately 20 percent. The small cow-calf operation would suffer almost a 23 percent decrease in total herd size. Hired ranch labor would decline by 3 jobs and a corresponding decrease in employee compensation of $20,675. The $900,000 estimated for rangeland developments in the short-term could

increase employment in the Resource Area economy by 18 jobs and increase employee compensation by approximately $218,000.

In the long-term, total AUMs for all operations would remain at an overall level below the 5-year average and preference. Total receipts would be approximately 3.4 percent below existing levels. The 154,000 acres identified for land tenure adjustment have an estimated value for analysis purposes of $15.4 million. Private sale of these lands could add $5.1 million or 2.2 percent to total assessed valuation of the Resource Area economy and increase private ownership by 17.1 percent. The estimated potential tax revenues are $82,238 and the payment in lieu of taxes would not affect the Resource Area economy. The construction and maintenance of 135 miles of new roads would inject approximately $3.9 million into the economy.

ALTERNATIVE IV -- NO ACTION

The No Action Alternative objective would be to maintain a status quo through current management direction and existing land use plan decisions.

Major Components

Livestock use would be maintained at the current preference level of 147,916 AUMs. No new rangeland improvements would be proposed except on existing AMPs that have not been fully implemented. Forage would continue to be provided for 5,955 mule deer and 731 pronghorn while the existing wild burro herd would remain at 12 animals. Current management for watershed would continue with maintenance of existing structures.

No new Special Management Areas would be designated while those already in existence would continue under current guidelines. All public land not currently designated as limited, closed, or open to ORV use would be managed as undesignated.

Annually, approximately 100 acres of public land would be considered for disposal. No new roads would be proposed, but easements would be acquired as needed.

Environmental Consequences

Soils

Under the No Action Alternative, current livestock use would continue. Medium and fine textured soils would continue to be compacted where livestock concentrate. Wind erosion would decrease slightly on areas where vegetation condition and ground cover improves, but would not be significant to the total erosion condition of the WSRA.

Medium and fine textured soils would be susceptible to compaction and formation of ruts by ORVs when soils are wet. Gravelly and cobbly soils become susceptible to accelerated erosion where unobstructed ORV travel

disturbs soils on steep slopes. Impacts by ORVs would remain primarily confined to populated areas of the WSRA.

Water Resources

No significant changes from the existing situation would occur concerning peak runoff rates, water quality, or water use by livestock and wildlife.

Vegetation

Acreage in fair and poor ecological condition would increase and acres in good ecological condition would decrease in the long-term. There are no acres in excellent condition. Acreage in fair and poor forage value classes would increase and acres in the good forage value class would decrease in the long-term. Acreage changes would be a result of the lack of vegetation treatments, grazing management treatments, and rangeland developments. Vegetation patterns would continue to change to brush-dominated areas without some vegetation treatment. Desirable perennial forage would have a small chance for recovery.

Livestock Grazing

Initial livestock grazing use would decrease in the long-term due to increased deterioration of rangeland condition, trend, and perennial forage production. Deterioration would be gradual; however, impacts from reduced livestock numbers on a voluntary basis could eventually become significant.

Wild Burros

Continuing present management would not significantly affect the wild burro population. The herd size would remain essentially unchanged. This would not be a significant short- or long-term impact. No action would be taken that would interrupt or change the migration or other movement of the wild burros.

Wildlife

There would be a decline in ecological conditions primarily in the rolling upland habitat types (including grass rolling upland) resulting in an increase in shrubs and shrub-associated species. This would result in a decline in preferred browse species and a small decline in big game populations. Without special designations of important habitat areas such as Percha Creek and Lake Holloman, no improvement would occur in these areas.

Cultural Resources

Sites would continue to be subject to trampling and other types of disturbance.

Social and Economic Conditions

Under the No Action Alternative, the economic structure of the Resource Area economy would not be affected. Any economic changes that would occur would not be due to factors related to this alternative. There would be no major adjustments in livestock grazing. Total receipts for livestock operations would not be adversely affected. The demographic characteristics in the Resource Area would not undergo any major changes. Local expenditures would continue to be made by individuals who use public land for recreation.

ALTERNATIVE V -- NO LIVESTOCK GRAZING

The objective of the No Livestock Grazing Alternative would be to eliminate livestock grazing from public land in the Resource Area.

Major Components

Livestock grazing would be eliminated on all public land. No new rangeland developments would be constructed for livestock and existing livestock developments would be abandoned or maintained only for nonlivestock resources. Forage would be provided for 12,588 mule deer and 1,666 pronghorn while the wild burro herd would be increased to 50 animals. Watershed values would be improved on 73,601 acres of rangeland.

Environmental Consequences

Access

Impacts on access to public land in the Resource Area would be low. Increasing mule deer and pronghorn might increase the need for access in areas specifically requested by hunters.

Soils

By removing livestock from public land, further livestock-related impacts to soils would be eliminated. No further soil compaction by livestock trailing or trampling would occur.

Soil erosion by water would be reduced as much as 20 percent on some sites where vegetation ground cover is increased and runoff is decreased. Wind erosion susceptibility would decrease slightly in some areas, but there would be no change in the wind erodibility groups of the soils.

Watershed treatments would improve erosion condition by eliminating further headcutting, improving soil stability, increasing vegetation ground cover, and decreasing soil loss. Approximately 73,601 acres of watersheds would be considered for treatments.

Water Resources

Peak runoff rates on key range sites would decrease an average of 18 percent in the long-term where vegetation cover increases a minimum of 5 percent. The reduced runoff would result in a decrease in dissolved solids and suspended sediments transported by runoff water.

Long-term water depletion by wildlife and earth stock tank evaporation would be approximately 216 acre-feet per year. Water consumption of approximately 165 acre-feet per year by livestock would be eliminated under this alternative.

Watershed improvements on 73,601 acres would include both structural and land treatment measures to address the problems of flood and sediment damages. Primary objectives of the treatments would include reducing peak runoff rates, reducing sediment yields, improving water quality, and better on-site utilization of runoff water.

Vegetation

Acreage in good ecological condition and good forage value class would increase in the long-term. Acreage in fair and poor ecological condition and fair and poor forage value classes would decrease in the long-term.

Livestock Grazing

Many livestock operators would be forced to liquidate, disperse their livestock, or obtain other lands for grazing to remain in business.

Wild Burros

Wild burro numbers would be increased to 50 head in the long-term.

Wildlife

Approximately 63 percent of the habitat sites in each SHS which are now in poor ecological condition would improve to fair and 21 percent of the sites in fair ecological condition would improve to good. This would result in increased diversity of plant and animal species. Increases would occur in some SHS's of preferred browse species composition, although there would be an overall decline in browse. Production of preferred browse species would be sufficient to provide for more than optimum big game populations.

Recreation

The elimination of livestock grazing could reduce vehicular access and increase nonmotorized recreation opportunities throughout the area. Interaction between recreational and nonrecreational users would be reduced.

Visual Resources

The apparent naturalness of portions of the area would increase slightly. There would be a slight increase in spring flowers, vegetation diversity, and the vigor and height of grasslands.

Wilderness

There would be improvement in the apparent naturalness, scenic qualities, and opportunities for solitude and primitive forms of recreation within the WSAs.

Cultural Resources

The impacts of livestock grazing on cultural resources would be eliminated.

Social and Economic Conditions

Under this alternative, those ranching operations which are heavily dependent on public land would be severely affected. Many operators and ranch hands would lose their identity and role of being associated with ranching as a lifestyle. For many, their psychological well-being would be diminished as well as losing an important part of their heritage. All livestock operations could be reclassified from their existing operations to the next lower size operation. Total receipts would be reduced by $2.3 million. Hired ranch labor would decline by 69 percent, which amounts to a decrease in ranch hand salaries of approximately $138,000. Total employment in the Resource Area economy would decline by approximately 41 jobs, with employee compensation declining by $31,000. Some operators and ranch hands may leave the livestock industry and seek nonranch jobs and other sources of income. Some may relocate to find suitable employment elsewhere.

SUMMARY OF ALTERNATIVES

Issue/Resource	Existing	Balanced Alternative I	Production Alternative II	Protection Alternative III	No Action Alternative IV	No Livestock Grazing[a] Alternative V
RANGELAND MANAGEMENT						
Livestock						
Forage (AUMs)						
Preference	147,916					
5-Year Average	135,261					
Short-Term		116,079	116,079	105,682	≤135,261 [b]	
Long-Term		181,864	191,003	130,115	≤135,261 [b]	
Rangeland Improvements[c]						none
Rangeland Developments						
Pipeline (miles)		56 3/4	65 1/4	64		
Fence (miles)		60	67 3/4	66		
Wells (number)		14	15	12		
Storage Tanks (number)		12	13	11		
Drinking Troughs (number)		37	38	35		
Earthen Stock Tanks (number)		9	9	9		
Catchments (number)		1	1	1		
Vegetation Treatments (acres)	none	62,720	149,093	none	none	none
Chemical		58,742	145,115			
Burning		2,381	2,381			
Seeding		1,597	1,597			
Grazing Systems	8 AMPs	I allotments	All allotments (except Section 15's)	no new	no new	none
Wildlife						
AUMs Allotted	3,458 [d]					
Mule Deer		30,234	14,281	30,234	14,281	30,234
Pronghorn		2,852	1,247	2,852	1,247	2,852
Watershed Treatments (acres)	maintenance	62,586	62,586	73,601	maintenance	73,601
Wild Burros (AUMs)	144	144	-0-	600	144	600
SPECIAL MANAGEMENT AREAS						
Watershed Treatment Areas (acres)		Limit ORV (62,586)		Limit ORV (73,601)		
Percha Creek Riparian Area (acres)		Fence and limit ORV (320)		Fence, close to ORV, and designate NSO (320)		
Study Plot Exclosures (number)(acres)		42--Fence and close to ORV (1,680)	3--Fence (120)	92--Fence, close to ORV, and designate NSO (3,680)		

SUMMARY OF ALTERNATIVES (continued)

Issue/Resource	Existing	Balanced Alternative I	Production Alternative II	Protection Alternative III	No Action Alternative IV	No Livestock Grazing[a] Alternative V
SPECIAL MANAGEMENT AREAS (continued)						
Lake Holloman (acres)		Eliminate livestock grazing (1,160)		Eliminate livestock grazing (2,520) and fence (1,360)		
Three Rivers Petroglyph Site and Picnic Area (acres)	Under C&MU Act[e], 220 acres fenced[e], and limited ORV (interim)	Limit ORV (960)		Limit ORV (960) and fence (740)	Limit ORV (960) (interim)	
Rattlesnake Hill (acres)	NSO [e] and limited ORV (interim)	Close to ORV (640)		Close to ORV and close to improvements (640)	Limit ORV (640) (interim)	
Sacramento Escarpment (acres)	NSO (3,160)[e]	Designate ACEC, limit ORV, and designate additional NSO (3,640)		Designate ACEC, close to ORV, withdraw from mineral entry, and designate additional NSO (4,300)		
Alamo Mountain (acres)	No drilling or storage facilities near cultural sites[e]	Designate NSO and close to ORV (200)		Designate NSO, close to ORV, and close to improvements (340)		
Lone Butte (acres)		Limit ORV (100)		Limit ORV (320)		
Jarilla Mountains (acres)		Close to ORV (120)		Close to ORV (320)		
Butterfield Trail and Jornada del Muerto Trail (acres)		Limit surface disturbance (2,220) (1,252)		Limit surface disturbance (2,220) (1,252)		
McGregor Range (acres)	Limited ORV (116,000) (interim)			Limit ORV (116,000)	Limit ORV (116,000) (interim)	
Cornudas Mountains (acres)		Limit ORV (15,490)		Limit ORV (15,490)		
Brokeoff Mountains (acres)	Wilderness Interim Management (31,386)[e]			Limit ORV (7,779)		
Cuchillo Mountains (acres)				Limit ORV (6,160)		
ORV Use (acres)						
Open	-0-	1,668,529	1,754,265	1,524,355	-0-	
Limited	117,600	83,096	-0-	220,310	117,600	
Closed	-0-	2,640	-0-	9,600	-0-	
Undesignated	1,636,655	-0-	-0-	-0-	1,636,665	

SUMMARY OF ALTERNATIVES (concluded)

Issue/Resource	Existing	Balanced Alternative I	Production Alternative II	Protection Alternative III	No Action Alternative IV	No Livestock Grazing[a/] Alternative V
LAND TENURE ADJUSTMENT (acres)	100 annually	45,000	58,000	177,000	100 annually	
Isolated and Difficult to Manage	x	x	x		x	
Lands Needed for Community Expansion	x	x	x	x	x	
Potential Exchange Lands	x			x	x	
Potential Acquisition Lands				x	x	
Land Where Interest Has Been Shown	x	x	x	x	x	
ACCESS						
Roads (miles)	-0-	238	422	135	-0-	
Easements (miles)	as needed	36	66	30	as needed	

Source: BLM Las Cruces District Office Files, 1984.

Notes: a/The No Livestock Grazing Alternative does not apply to the Special Management Areas, Land Tenure Adjustment, or Access issues.
b/An unknown amount of AUMs less than the 5-year average.
c/Under the No Action Alternative, only Range Betterment Funds will be used.
d/Existing AUMs allotted as shown in BLM case files. For analytical purposes, New Mexico Department of Game and Fish numbers were used.
e/Common to all alternatives.
x -- Indicates which proposals are being considered under each alternative.

SUMMARY OF IMPACTS

	Existing	Balanced Alternative I		Production Alternative II		Protection Alternative III		No Action Alternative IV		No Livestock Grazing Alternative V	
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term
LANDS											
BLM Ownership	NS	NS	-2.5%	NS	-3.25%	NS	-8.5% +1.25%[a]	NS	NS	NS	NS
ACCESS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GEOLOGY AND MINERALS	NC	-	-	NS	NS	-	-	NS	NS	NS	NS
Mineral Exploration and Development											
SOILS											
Sediment Yield	NC	NS	+	NS	+	NS	+	NS	NS	NS	+
WATER RESOURCES											
Runoff	NC	NS	-15%	NS	-17%	NS	-14%	NS	NC	NS	-18%
Quality											
Surface	stable	NS	+	-	+	+	+	NS	NS	+	+
Subsurface	stable	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Depletion (acre-feet/year)											
Livestock, Wildlife, and Evaporation	380	388	450	359	462	327	390	NC	NC	215	216
VEGETATION											
Ecological Condition (acres)											
Excellent	0	0	17,900	0	28,707	0	8,950	0	0	0	0
Good	138,216	138,216	227,063	138,216	295,227	138,216	337,781	138,216	69,746	138,216	448,499
Fair	386,596	386,596	470,653	386,596	481,643	386,596	403,876	386,596	433,242	386,596	337,099
Poor	413,005	413,005	222,201	413,005	132,240	413,005	187,210	413,005	434,829	413,005	152,219
Forage Value Condition (acres)											
Good	422,239	422,239	535,922	422,239	565,406	422,239	572,546	422,239	328,414	422,239	609,214
Fair	252,401	252,401	215,180	252,401	272,138	252,401	200,528	252,401	335,345	252,401	185,831
Poor	263,177	263,177	186,715	263,177	100,273	263,177	164,743	263,177	274,058	263,177	142,772
Ground Cover	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Threatened or Endangered Plant Species	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
LIVESTOCK GRAZING											
Stocking Levels (AUMs)	147,916[b]	116,079[c]	181,864	116,079[c]	191,003	105,682[c]	130,115	147,916[b]	147,916	0[d]	0
WILD BURROS (number)	12	12	12	0	0	12	50	12	12	12	50

SUMMARY OF IMPACTS (continued)

	Existing	Balanced Alternative I		Production Alternative II		Protection Alternative III		No Action Alternative IV		No Livestock Grazing Alternative V	
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term
WILDLIFE											
AUMs Allotted[e/]	3,458[f/]										
Mule Deer (AUMs)		14,281(NC)	30,234(-)	14,281(NC)	14,281(-)	14,281(+)	30,234(-)	14,281(-)	14,281(-)	14,281(+)	30,234(+)
Pronghorn (AUMs)		1,247(NC)	2,852(-)	1,247(NC)	1,247(-)	1,247(+)	2,852(-)	2,852(-)	2,852(-)	2,852(+)	2,852(+)
Production of Preferred and Intermediate Browse Species (pounds per acre)	5.2	5.2	5.9	5.2	6.4	5.2	6.4	5.2	4.8	5.2	6.9
Change in Ecological Condition of Standard Habitat Sites[g/]	N/A	MC	+21-1%	MC	+28-3%	MC	+46-1%	MC	-7-0%	MC	+63-21%
Threatened or Endangered Fauna Species	NC	+	+	-	-	+	+	-	-	+	+
Riparian Areas	NC	+	+	+	+	+	+	-	-	+	+
RECREATION											
Recreation Opportunities	stable	+/-	+/-	-	-	+	+	NS	NS	+	+
Recreational Use	stable	+	+	+	+	NS	NS	NS	NS	NS	NS
VISUAL RESOURCES	stable	+/-	+/-	-	-	-	-	NS	NS	+	+
WILDERNESS	stable	-	-	NS	NS	NS	NS	NS	NS	+	+
CULTURAL RESOURCES											
Disturbance Due To:											
Trampling	SI	NC	I	NC	I	D	SD	NC	NC	D	D
Erosion	NC	NC	D	NC	D	D	D	NC	NC	SD	D
ORVs	NC	SI	SD	NC	NC	D	D	NC	NC	NC	NC
ECONOMIC CONDITIONS (dollars)											
Total Receipts	3,420,807	3,078,905	4,374,735	3,078,905	4,487,896	2,911,151	3,303,978	3,420,807	3,420,807	1,140,011	1,104,011
Change	NC	-341,902	953,928	-341,902	1,067,089	-509,656	-116,829	NC	NC	-2,316,796	-2,316,796
Variable Costs	1,712,575	1,435,178	1,932,833	1,435,178	1,988,158	1,351,322	1,542,176	1,712,575	1,712,575	521,090	521,090
Change	NC	-277,397	220,258	-277,397	275,583	-361,253	-170,399	NC	NC	-1,191,485	-1,191,485
AUM Costs	357,150	325,235	451,518	325,235	463,275	307,025	349,200	357,150	357,150	119,817	119,817
Change	NC	-31,915	14,368	-31,915	106,125	-50,125	-7,950	NC	NC	-237,333	-237,333
Returns Above Variable Costs	1,351,082	1,318,492	1,990,384	1,318,492	2,036,463	1,252,804	1,412,602	1,351,082	1,351,082	463,104	463,104
Change	NC	-32,590	639,302	-32,590	685,381	-98,278	61,520	NC	NC	-887,978	-887,978
Fixed Costs[h/]	245,980	245,980	245,980	245,980	245,980	245,980	245,980	245,980	245,980	245,980	245,980
Depreciation[h/]	618,574	618,574	618,574	618,574	618,574	618,574	618,574	618,574	618,574	618,574	618,574
Returns to Operator Labor, Management, and Capital	486,528	453,938	1,125,830	453,938	1,171,909	388,250	548,048	486,528	486,528	-401,450	-401,450
Change	NC	-32,590	639,302	-32,590	685,381	-98,278	61,520	NC	NC	-887,978	-887,978

SUMMARY OF IMPACTS (concluded)

	Existing	Balanced Alternative I		Production Alternative II		Protection Alternative III		No Action Alternative IV		No Livestock Grazing Alternative V	
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term
ECONOMIC CONDITIONS (dollars) (continued)											
Hired Ranch Labor (jobs)	29	27	45	27	46	26	29	29	29	9	9
Change	0	-2	16	-2	17	-3	0	0	0	-20	-20
Ranch Labor, Wages, and Salaries (dollars)	203,763	191,044	315,350	191,044	321,006	183,089	203,984	203,763	203,763	66,118	66,118
Change	0	-12,719	111,587	-12,719	117,243	-20,674	221	0	0	-137,645	-137,645
Estimated Fair Market Value (Lands) (dollars)	N/A	NC	4,500,000	NC	5,800,000	NC	15,400,000	NC	10,000	N/A	N/A
Estimated Assessed Valuation (Lands)	N/A	NC	1,499,850	NC	1,933,333	NC	5,132,820	NC	3,333	N/A	N/A
Estimated Potential Tax Revenue (Lands)	N/A	NC	24,031	NC	30,971	NC	82,238	NC	53	N/A	N/A
Construction and Maintenance (Access)											
Roads (miles)	N/A	NC	238	NC	422	NC	135	NC	NC	N/A	N/A
Cost (dollars)	N/A	NC	6,207,000	NC	8,600,000	NC	3,900,000	NC	NC	N/A	N/A

Source: BLM Las Cruces District Office Files, 1984.

Notes:
a/Reflects land acquisition by the BLM.
b/This figure is preference. Actual stocking would be closer to the 5-year average of 135,261 AUMs.
c/Estimated worst-case allocation. The monitoring studies would be used to determine actual levels of livestock use.
d/All AUMs would be available for big game.
e/AUM numbers followed by a (-) means that the vegetation inventory data indicate browse production may be insufficient while a (+) means that browse production would be more than sufficient for the big game numbers indicated.
f/Existing AUMs allotted as shown in BLM case files.
g/Indicates a range of change to the next higher ecological condition class. Under the Balanced Alternative, 21 percent of an unspecified SHS would change on the high end while only 1 percent of another SHS would improve on the low end.
h/Fixed costs and depreciation costs are assumed to remain constant.
I -- Increase.
D -- Decrease.
MC -- Minor Change.
N/A -- Not Applicable.
NC -- No Change.
NS -- Not Significant.
SD -- Slight Decrease.
SI -- Slight Increase.
+ -- Beneficial impact.
- -- Negative impact unless otherwise noted.

TABLE OF CONTENTS

Page

CHAPTER 1 - INTRODUCTION

LOCATION 1-1
PURPOSE AND NEED 1-1
PLANNING PROCESS 1-3
Step 1. Identification of Issues 1-3
Step 2. Development of Planning Criteria 1-3
Step 3. Inventory Data and Information Collection 1-3
Step 4. Management Situation Analysis 1-3
Step 5. Formulation of Alternatives 1-3
Step 6. Estimation of Effects of Alternatives 1-3
Step 7. Selection of the Preferred Alternative 1-4
Step 8. Selection of the Resource Management Plan 1-4
Step 9. Monitoring and Evaluation 1-4
MAJOR ISSUES 1-4
Rangeland Management 1-4
Special Management Areas 1-4
Land Tenure Adjustment 1-4
Access 1-5
PLANNING CRITERIA 1-5
Issue 1 -- Rangeland Management 1-5
Issue 2 -- Special Management Areas 1-6
Issue 3 -- Land Tenure Adjustment 1-6
Issue 4 -- Access 1-6

CHAPTER 2 - ALTERNATIVES

DEVELOPMENT OF ALTERNATIVES 2-1
ALTERNATIVES CONSIDERED IN DETAIL 2-1
Alternative I -- Balanced 2-1
Alternative II -- Production 2-5
Alternative III -- Protection 2-7
Alternative IV -- No Action 2-9
Alternative V -- No Livestock Grazing 2-11
MANAGEMENT GUIDANCE COMMON TO ALL ALTERNATIVES 2-12
Lands 2-12
Access 2-13
Energy and Minerals 2-14
Soils, Water Resources, and Air Quality 2-15
Rangeland Management 2-16
Wild Burros 2-22
Wildlife 2-22
Recreation 2-24
Visual Resources 2-24
Wilderness 2-24
Cultural Resources 2-25
Fire Management 2-25
ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS . . 2-26
Off-Road Vehicle (ORV) Restrictions 2-26
COMPARISON OF ALTERNATIVES 2-26

TABLE OF CONTENTS (continued)

Page

CHAPTER 3 - AFFECTED ENVIRONMENT

INTRODUCTION 3-1
PHYSICAL SETTING 3-1
Climate 3-1
Topography 3-1
LANDS 3-2
ACCESS 3-3
GEOLOGY AND MINERALS 3-3
Past and Present Producing Areas 3-4
Potential Producing Areas 3-6
SOILS 3-7
General Description 3-7
Soil Erosion 3-7
WATER RESOURCES 3-8
Surface Water 3-8
Ground Water 3-9
Water Use 3-10
Problem Areas 3-10
VEGETATION 3-11
Vegetation Subtypes and Range Site Descriptions 3-15
Forage Species 3-18
Poisonous Plants 3-18
Threatened or Endangered Plant Species 3-19
LIVESTOCK GRAZING 3-19
Production Problems 3-19
WILD BURROS 3-20
WILDLIFE 3-21
Standard Habitat Sites 3-21
Special Habitat Features (SHFs) 3-25
Terrestrial Wildlife 3-26
Big Game 3-26
Small Game 3-28
Nongame 3-28
Waterfowl 3-28
Fisheries 3-28
Threatened or Endangered Fauna Species 3-29
RECREATION 3-29
Dispersed 3-29
Developed 3-31
Recreation Opportunity Spectrum 3-31
VISUAL RESOURCES 3-31
WILDERNESS 3-32
CULTURAL RESOURCES 3-33
SOCIAL AND ECONOMIC CONDITIONS 3-36
Introduction and Description of Study Region 3-36
Social Setting 3-39
Structure of the Economy 3-41
Income 3-41

TABLE OF CONTENTS (continued)

Page

CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

INTRODUCTION 4-1
IMPACTS OF ALTERNATIVES 4-2
Alternative I - Balanced 4-2
Alternative II -- Production 4-31
Alternative III -- Protection 4-46
Alternative IV -- No Action 4-62
Alternative V -- No Livestock Grazing 4-68

CHAPTER 5 - PUBLIC PARTICIPATION AND COORDINATION

INTRODUCTION 5-1
PUBLIC PARTICIPATION 5-1
FORMAL CONSULTATION 5-5
CONSISTENCY WITH OTHER PLANS 5-6
PUBLIC REVIEW OF THE DRAFT RMP/EIS 5-6
Congressional Delegation and New Mexico State Legislators . . 5-6
New Mexico State Agencies 5-6
Federal Agencies 5-7
Local and Regional Governments, Agencies, and Indian Tribes . 5-7
Livestock-Related Organizations 5-7
Conservation Organizations 5-8
Other Organizations 5-8
Other Groups 5-8
Universities and Libraries 5-9
HEARINGS 5-9

APPENDICES

APPENDIX A - LANDS
A-1 Land Tenure Adjustment Parcels -- Balanced Alternative . A-1
A-2 Land Tenure Adjustment Parcels -- Production Alternative A-6
A-3 Potential Acquisition Lands -- Protection Alternative . A-13

APPENDIX B - WATER RESOURCES
B-1 Water Resources Methodology -- Surface Runoff B-1
B-2 Water Quality Criteria for Livestock and Wildlife Use . B-3
B-3 Water Quality Standards for Ground Water of 10,000 mg/l Total Dissolved Solids Concentration or Less B-4

APPENDIX C - VEGETATION
C-1 Summary of Proposed Vegetation Treatments on Public Land -- Balanced Alternative C-1
C-2 Summary of Proposed Vegetation Treatments on Public Land -- Production Alternative C-2
C-3 Guidelines for Vegetation Treatments C-4

TABLE OF CONTENTS (continued)

Page

APPENDICES (continued)

APPENDIX C - VEGETATION (continued)
C-4 Methodology -- Modified Soil Vegetation Inventory and Digitizing C-10
C-5 Methodology -- Forage Value Class C-12
C-6 Methodology -- Ecological Condition Class C-14
C-7 Methodology -- Apparent Trend C-16
C-8 Methodology -- Determination of the Estimated Acre Changes for Each Ecological Condition and Forage Value Class C-18
C-9 Major Plant Species Identified in Otero and Parts of Lincoln, Eddy, and Chaves Counties C-19
C-10 Average Production and Plant Composition C-22
C-11 Public Land Acres and Percent by Vegetation Subtype and Range Site . . . . . follows C-28
C-12 Federal Endangered, Proposed, Candidate, and State Sensitive Plants C-29
C-13 Poison Plants Identified in Otero County and Parts of Eddy, Lincoln, and Chaves Counties C-33

APPENDIX D - LIVESTOCK GRAZING
D-1 Proposed Management Categories by Allotment D-1
D-2 Bureau of Land Management, New Mexico Rangeland Consultation, Cooperation, and Coordination Policy Section 8 Public Rangelands Improvement Act (PL-95-514) D-2
D-3 Criteria Used for Categorizing I, M, and C Allotments . D-11
D-4 Categorization and Present Acres in Each Ecological Condition Class by Allotment D-14
D-5 Proposed Rangeland Developments -- Balanced Alternative D-17
D-6 Proposed Rangeland Developments -- Production Alternative D-21
D-7 Proposed Rangeland Developments -- Protection Alternative D-25
D-8 Acreage and Grazing Capacity by Allotment D-29
D-9 Carrying Capacity and Management Status by Allotment by Alternative D-32

APPENDIX E - WILDLIFE
E-1 Methodology -- Wildlife E-1
E-2 Correspondence Concerning Section 7 Consultation With U.S. Fish and Wildlife Service E-4
E-3 Big Game Populations by Allotment for the White Sands Resource Area E-7

APPENDIX F - RECREATION
Recreation Opportunity Spectrum Inventory and Evaluation Process F-1

TABLE OF CONTENTS (continued)

Page

APPENDICES (continued)

APPENDIX G - VISUAL RESOURCES
Visual Resources Inventory and Evaluation Process . . . G-1

APPENDIX H - CULTURAL RESOURCES
Letters of Consultation with the State Historic Preservation Officer H-1

APPENDIX I - ECONOMIC CONDITIONS
I-1 Developing Ranch Budgets for the White Sands Resource Management Plan I-1
I-2 Ranch Budget Linear Programming Model I-15
I-3 Regional Analysis Methodology I-17
I-4 Land Tenure Adjustment Analysis Methodology I-19

APPENDIX J - SOILS
Pacific Southwest Interagency Committee (PSIAC) Methodology for Calculating Sediment Yield J-1

APPENDIX K - LIST OF TECHNICAL REPORTS K-1

GLOSSARY GL-1

REFERENCES CITED R-1

INDEX IN-1

ILLUSTRATIONS

Map Page

1-1 General Location -- White Sands Resource Management Plan Area . 1-2

2-1 Proposed Vegetation Treatment Areas -- Balanced . . . . follows 2-3
2-2 Proposed Special Management Areas and Access -- Balanced . . . . . follows Map 2-1
2-3 Proposed Vegetation Treatment Areas -- Production . . . follows 2-6
2-4 Proposed Access -- Production . . . . . follows 2-7
2-5 Proposed Special Management Areas and Access -- Protection . . . . . follows Map 2-4
2-6 Land Tenure Adjustment -- Protection . . . . . follows 2-9
2-7 Existing Special Management Areas and Access -- No Action . . . . . follows 2-10

TABLE OF CONTENTS (continued)

ILLUSTRATIONS (continued)

Map		Page
3-1	Non-Energy Mineral Resources	follows 3-4
3-2	Energy Mineral Resources	follows 3-6
3-3	Surface Water Basins and Major Drainages	follows 3-8
3-4	Big Game Population Areas	follows 3-26
3-5	Recreation Opportunities Spectrum	follows 3-31
3-6	Visual Resource Management Classes and Wilderness Study Areas	follows 3-32
3-7	Cultural Resources	follows 3-34

The following oversize visuals are located in the map pocket:

Visual A Land Status -- Otero County
Visual B Land Status -- Sierra County
Visual C Vegetation Types
Visual D Allotments
Visual E Land Tenure Adjustment -- Sierra County
Visual F Land Tenure Adjustment -- Otero County

TABLES

Table		Page
2-1	Rates of Application for Chemical Herbicides	2-20
2-2	Seed Mixture	2-21
2-3	Summary of Alternatives	2-27
2-4	Summary of Impacts	2-30
3-1	WSRA Land Status in Acres	3-2
3-2	Locatable Mineral Resources of the White Sands Resource Area	3-4
3-3	Public Land Acres and Percentages for Ecological Condition and Forage Value Class by Range Site	3-12
3-4	Average Vegetation Production by Range Site	3-14
3-5	Acres and Percent of Public Land by Vegetation Subtype	3-15
3-6	Summary of Public Land Acres and Percent by Range Sites and Major Vegetation Subtypes	3-16
3-7	Standard Habitat Site Comparison Data	3-22
3-8	Special Habitat Features	3-26
3-9	Big Game Use of Standard Habitat Sites	3-27
3-10	Threatened, Endangered or Sensitive Animal Species in the WSRA	3-30
3-11	Recreation Opportunity Spectrum Acreage Classifications by County	3-31
3-12	Wilderness Study Areas in the WSRA	3-32
3-13	Cultural Resource Surveys	3-33
3-14	Cultural Periods and Resource Affiliation in the Resource Area	3-34
3-15	Correlation Between Cultural Sites and Vegetation Types in the Resource Area	3-35

TABLE OF CONTENTS (concluded)

TABLES (continued)

Table		Page
3-16	Physical Condition of Cultural Sites in the Resource Area	3-35
3-17	Populations of Communities in the White Sands Resource Area	3-38
3-18	White Sands Resource Area Population Projections	3-38
3-19	Major Employment Sectors, White Sands Resource Area, 1980 (Otero and Sierra Counties)	3-42
3-20	Total Personal Income and Per Capita Income by County, 1980	3-43
3-22	Distribution of Total Personal Income, 1980, White Sands Resource Area	3-43
3-22	Sierra County Livestock Inventory, 1982	3-44
3-23	Otero County Livestock Inventory, 1982	3-44
3-24	Estimated Costs and Returns for All Ranch Operations, 1982	3-46
4-1	Summary of Total Projected Public Land Acres Changes by Ecological Condition and Forage Value Class by Alternatives	4-10
4-2	Projected Public Land Acres By Range Site for Each Ecological Condition and Forage Value Class (Alternative I -- Balanced)	4-11
4-3	Comparison of Ecological Condition Data	4-18
4-4	Projected Long-Term Populations -- Big Game	4-20
4-5	Estimated Annual Costs and Returns for Individual BLM Ranch Operations for Otero County, 1982 -- Balanced Alternative	4-27
4-6	Estimated Annual Costs and Returns for All BLM Ranch Operations by Alternative for Otero County, 1982	4-29
4-7	Projected Public Land Acres By Range Site for Each Ecological Condition and Forage Value Class (Alternative II -- Production)	4-36
4-8	Estimated Annual Costs and Returns for Individual BLM Ranch Operations for Otero County, 1982 -- Production Alternative	4-47
4-9	Projected Public Land Acres By Range Site for Each Ecological Condition and Forage Value Class (Alternative III -- Protection)	4-53
4-10	Estimated Annual Costs and Returns for Individual BLM Ranch Operations for Otero County, 1982 -- Protection Alternative	4-61
4-11	Projected Public Land Acres By Range Site for Each Ecological Condition and Forage Value Class (Alternative IV -- No Action)	4-65
4-12	Estimated Annual Costs and Returns for Individual BLM Ranch Operations for Otero County, 1982 -- No Action Alternative	4-67
4-13	Projected Public Land Acres By Range Site for Each Ecological Ecological Condition and Forage Value Class (Alternative V -- No Livestock Grazing)	4-71
4-14	Estimated Annual Costs and Returns for Individual BLM Ranch Operations for Otero County, 1982 -- No Livestock Grazing Alternative	4-75
5-1	List of Preparers	5-2

CHAPTER 1

INTRODUCTION

CHAPTER 1
INTRODUCTION

LOCATION

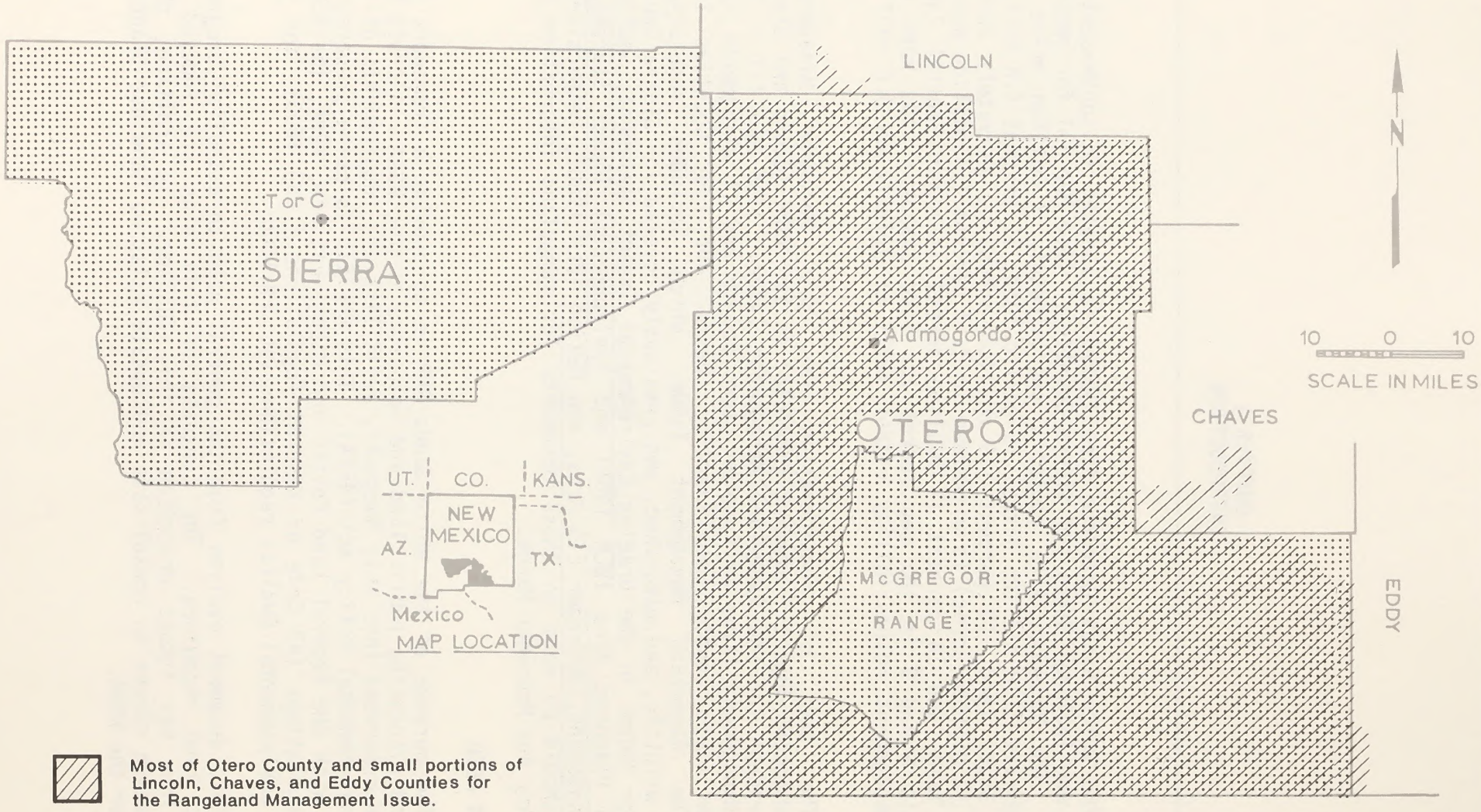
The White Sands Resource Area (WSRA) is located in south-central New Mexico and includes Otero and Sierra Counties. (See Map 1-1 for general location.) The Resource Area contains approximately 7 million acres of which 25 percent (1.8 million acres) is public land, 12 percent (.8 million acres) is State land, 13 percent (.9 million acres) is privately owned, 29 percent (2 million acres) is withdrawn land, 7 percent (.4 million acres) is Indian land, and 14 percent (1 million acres) is other Federal land. (See Visuals A and B in the map pocket for land status.) The WSRA has minerals management responsibility either fully or jointly on 3.6 million acres.

The area of consideration for this Resource Management Plan/Environmental Impact Statement (RMP/EIS) is the WSRA (Otero and Sierra Counties) except for the Rangeland Management Issue. (See Map 1-1.) The Rangeland Management Issue will cover Otero County and 11 allotments that extend from Otero County into Lincoln, Chaves, and Eddy Counties (BLM 1980). The Rangeland Management Issue, which includes vegetation, livestock, wildlife, and watershed, was previously covered for Sierra County and McGregor Range in the Grazing Environmental Impact Statement, Southern Rio Grande Planning Area (BLM 1981) and Environmental Impact Statement, Grazing Management, McGregor EIS Area, New Mexico (BLM 1980), respectively. Reference should be made to those documents for rangeland information for Sierra County and McGregor Range.

PURPOSE AND NEED

The purpose of the White Sands RMP is to provide a framework for managing and allocating public land and resources in the WSRA. A draft EIS has been incorporated into this document, fulfilling the requirements of the National Environmental Policy Act (NEPA). This RMP/EIS is being prepared in accordance with the Federal Land Policy and Management Act, NEPA, the BLM's planning regulations (43 Code of Federal Regulations [CFR] 1600), and the Council on Environmental Quality regulations (40 CFR 1500).

This document evolves from the general need to establish programs for public land resources. The contents of this plan are focused on resolving four key issues described in this chapter. In addition, this planning action serves to consolidate and update existing land use planning guidance for the WSRA.



Most of Otero County and small portions of Lincoln, Chaves, and Eddy Counties for the Rangeland Management Issue.

Sierra and Otero Counties for the Special Management Areas, Land Tenure Adjustment, and Access Issues.

MAP 1-1

GENERAL LOCATION

WHITE SANDS RESOURCE MANAGEMENT PLAN AREA

SOURCE: BLM Las Cruces District Files 1984.

PLANNING PROCESS

The BLM resource management planning process consists of nine basic steps and requires the use of an interdisciplinary team for the completion of each step. The first seven steps have been completed. The planning steps described in the regulations (43 CFR 1600) and used in preparing this plan are described below. The specific documents involved in each step are available for review at the WSRA Office.

Step 1. Identification of Issues

This step is intended to identify resource management problems or conflicts that can be resolved through the planning process.

Step 2. Development of Planning Criteria

During this step, preliminary determinations are made regarding the kinds of information needed to clarify the issues, the kinds of alternatives to be developed, and the factors to be considered in evaluating alternatives and selecting a preferred RMP.

Step 3. Inventory Data and Information Collection

This step involves the collection of various kinds of issue-related resource, environmental, social, economic, or institutional data needed for completion of the process. The types of inventory completed are discussed in Chapter 3 under the respective resources.

Step 4. Management Situation Analysis

This step calls for a deliberate assessment of the current situation. It includes a description of current BLM management guidance, a discussion of existing problems and opportunities for solving them, and a consolidation of existing data that is needed to analyze and resolve the identified issues. The Management Situation Analysis is available for public review in the WSRA Office.

Step 5. Formulation of Alternatives

During this step, several complete, reasonable resource management alternatives are prepared. These alternatives include one for no action and several that strive to resolve the issues while placing emphasis either on environmental protection or resource production. The alternatives are described in Chapter 2.

Step 6. Estimation of Effects of Alternatives

The physical, biological, economic, and social effects of implementing each alternative are estimated in order to allow for a comparative evaluation of impacts. A discussion of the estimation of the effects of the alternatives is located in Chapter 4.

Step 7. Selection of the Preferred Alternative

Based on the information generated during Step 6, the District Manager, with the approval of the State Director, identifies a preferred alternative. The draft RMP/EIS document is then prepared and distributed for public review. For this White Sands RMP/EIS, the Balanced Alternative (Alternative I) was selected as the preferred alternative.

Step 8. Selection of the Resource Management Plan

Based on the results of public review and comment, the District Manager will select a proposed RMP and publish it along with a final EIS. The plan becomes final after a 30-day protest period. The plan can be selected from the range of alternatives.

Step 9. Monitoring and Evaluation

This step involves the collection and analysis of long-term resource condition and trend data to determine the effectiveness of the plan in resolving the identified issues, and to ensure that implementation of the plan is achieving the desired results. Monitoring continues from the time the RMP is adopted until changing conditions require a revision of the whole plan or any portion of it.

MAJOR ISSUES

Four issues are addressed in this document. These issues were identified by BLM specialists and managers together with the public, other Federal agencies, and State and local governments.

Rangeland Management

Various levels of rangeland use by livestock, wildlife, watershed, and wild burros, as required by BLM policy, will be considered in the planning process. Forage utilization, rangeland improvements, and management intensity will be considerations under this topic. The proper use of forage by livestock and wildlife, as well as providing ground cover for watershed protection, are of management concern throughout the Resource Area.

Special Management Areas

Designation of public land as open, limited, or closed to off-road vehicle (ORV) use will be a consideration in the planning process. Certain areas may also warrant special management due to their unusual, historic, cultural, mineral, recreational, natural hazard, or scenic value; their natural systems or processes; and their significance and special worth, consequence, meaning, distinctiveness, or cause for concern.

Land Tenure Adjustment

Identification of lands which might be suitable for disposal is a current management concern. Those areas within the Resource Area that contain isolated parcels of land that are difficult and uneconomical to

manage will be identified. Other considerations will be areas where disposal will serve important public objectives. These will include, but not be limited to, expansion of communities as needed for economic development which could not be achieved prudently or feasibly on land other than public land. Exchanges will also be considered.

Access

Development of access to areas of public land, especially those having significant resource or recreation values for which there is high demand and no legal access, is a management concern. In areas where there is mixed private, State, and Federal land ownership, some of the roads on public land are accessible only by traveling across roads on non-Federal lands. It is conceivable that, in situations where the roads across non-Federal lands are not considered to be "public domain" roads (i.e., are not maintained by the county or state, or considered to be public thoroughfares due to a history of established use), the non-Federal landowner could block access to both BLM and the public. This could result in public land being isolated from public use and BLM management activities.

PLANNING CRITERIA

Planning criteria were developed during the planning process to ensure that the planning steps were focused on the issues. Planning criteria were used to guide resource inventories, establish an outline for the Management Situation Analysis, aid in formulating alternatives, and highlight factors to be considered in evaluating alternatives and selecting a preferred alternative.

The various criteria used are available for review at the WSRA Office. The criteria that were used to identify alternatives are as follows.

Issue 1 - Rangeland Management

1. Maintain or improve rangeland condition.

   a. Where possible, improve poor condition rangeland to fair.

   b. Where possible, improve fair condition rangeland to good.

   c. Maintain all good and excellent condition rangeland.

2. Maintain or enhance wildlife habitat condition in areas where forage production is a limiting factor, through land treatment and management practices.

3. Improve eroded watershed areas and take measures to prevent areas from becoming critically eroded.

4. Provide cost-effective management of the wild burro herd in the Three Rivers area.

Issue 2 - Special Management Areas

1. Designate all public land open to ORV use within the following constraints: protection of the resource, promotion of all users, and minimization of conflicts among various users.

2. Designate those areas that have unusual, historic, cultural, mineral, recreational, natural hazard, or scenic value; that represent natural systems or processes; and which have significance and special worth, consequence, meaning, distinctiveness, or cause for concern.

Issue 3 - Land Tenure Adjustment

1. Provide lands in an orderly manner to meet the projected needs expressed by local, city, county, and state governments.

2. Provide lands for disposal whose location or other physical characteristics make them difficult or uneconomic to manage as part of the public land.

3. Provide lands for exchange purposes.

Issue 4 - Access

1. Provide legal access to those areas of public land having significant resource values or for which there is a high public demand.

2. Provide restricted access for BLM management needs.

CHAPTER 2

ALTERNATIVES

CHAPTER 2
ALTERNATIVES

DEVELOPMENT OF ALTERNATIVES

Alternatives were developed based on the issues listed in Chapter 1 and guided by the alternative formulation criteria, public consultation, coordination with other agencies, and evaluation by BLM. Only significant issues are addressed. The alternatives fall within the following framework:

1. Alternatives I, II, and III represent a reasonable range of options among multiple-use management programs. The alternatives range from favoring production to favoring protection to reflect the issues involved.

2. Alternative IV is the No Action Alternative.

3. Alternative V is the No Livestock Grazing Alternative.

Management guidance applicable to all alternatives is discussed following the description of the five alternatives. Also discussed in this chapter are alternatives that were considered but not analyzed in detail. Tables 2-3 and 2-4, at the end of this chapter, summarize the components and effects of the five alternatives.

ALTERNATIVES CONSIDERED IN DETAIL

Alternative I -- Balanced

Objective

The Balanced Alternative provides a combination of balanced and diverse resource uses throughout the Resource Area. This alternative provides for the production of needed goods and services while protecting important and sensitive environmental values.

Major Components

Issue 1 -- Rangeland Management

1. A rangeland management program would be initiated on 67 allotments covering 870,163 acres that have a high potential for improvement and resolution of resource conflicts (Category I allotments). (See Appendix D-1.) The initial livestock forage use would be mutually agreed upon, if possible, between the permittees and BLM and could be up to preference. If agreement cannot be reached, the decision issued will be for preference numbers. If adjustments in livestock numbers are found to be

necessary through monitoring studies, decisions would be issued stating what changes would be needed. These could be implemented over a 5-year period following the issuance of the decision. Following consultation with the permittee, BLM proposes to establish the following:

-- proper level of forage utilization;
-- initial stocking rate;
-- the kind of livestock allowed;
-- the period of use;
-- areas to be excluded from livestock grazing; and
-- the initial allotment of forage to big game species.

At the end of the monitoring period, the BLM proposes to establish:

-- proper stocking rate;
-- grazing treatments; and
-- rangeland developments and vegetation treatments necessary to properly manage the renewable resources of the Resource Area.

It is assumed that initial authorized livestock grazing use on all allotments would approximate the 5-year average (135,261 AUMs) and not exceed preference (147,916 AUMs). There are presently 8 allotments (127,678 acres) with existing Allotment Management Plans (AMPs) approved prior to 1975. All allotments have prescribed grazing systems. Under the Balanced Alternative, the management plans for these allotments would continue. The past 5-year (1979-1983) average licensed grazing use indicates that 135,261 AUMs of forage were authorized for use by livestock annually on public land in Otero and parts of Lincoln, Eddy, and Chaves Counties. This information will be used as a basis for negotiating initial livestock grazing use. However, information indicates that a lower level of livestock grazing use may be more appropriate in some areas in fair and poor condition.

Following completion of the Final RMP, a Rangeland Program Summary outlining the rangeland management program will be written and distributed to the public. In those instances where no changes in management or livestock numbers are anticipated or where specific changes in management or livestock numbers are known, a letter or decision will be issued within 17 months after the Final RMP is filed. Before adverse decisions are made, each adversely affected permittee will be contacted and the "Section 8" Rangeland Consultation Policy (see Appendix D-2) will be followed.

Where information is lacking, unreliable, or if an agreement cannot be reached, an allotment-specific monitoring program will be initiated for a period of up to 5 years. If monitoring studies show a need for adjustments, a second decision will be issued which sets forth the adjustment to be implemented over a 5-year period. The 5-year adjustment period can be waived if an agreement is reached with the permittee to implement the decision in less than 5 years or the total suspension is 15 percent or less of the authorized active grazing use for the previous year.

Since there is a possibility that livestock grazing use may be adjusted to an unknown level below the 5-year average use, a lower level of grazing use of approximately 118,631 AUMs was used for analytical purposes. The projected lower level, or worst-case, was determined only for allotments in the Improve (I) Category. (See Appendix D-3 for criteria used in designating categories.) It was assumed that no adjustments would be needed on areas in good to excellent ecological condition, a 20 percent downward adjustment on areas in fair condition, and a 35 percent downward adjustment on the areas in poor condition. (Appendix D-4 contains acres of ecological condition by allotment.) These adjustment figures reflect resource conflicts.

Through chemical vegetation treatment on 58,742 acres, forage production would increase by 6,017 AUMs (from 147,916 AUMs to 153,933 AUMs) in the long-term (20 years). In addition, prescribed burning is proposed for 2,381 acres and seeding is proposed for 1,597 acres. (See Map 2-1 for location of vegetation treatments and Appendix C-1 for acres treated by allotment.) Livestock grazing systems would be developed in cooperation with the livestock operator on Category I allotments. (See page 2-18.) It is estimated that the following rangeland developments would be constructed in the short-term (see Appendix D-5): 56 3/4 miles of pipeline, 60 miles of fence, 14 wells with pump or windmill, 12 storage tanks (20,000 gallons each), 37 drinking troughs, 9 earthen stock tanks, and 1 catchment. In the long-term (20 years), projected livestock forage would be 181,864 AUMs as a result of vegetation treatments, grazing management treatments, and rangeland developments.

All allotments proposed for Category I would be monitored. (See Appendix D-1, Proposed Management Categories by Allotment.) The number and frequency of studies per allotment would be determined by local conditions and BLM's budgetary constraints. The allotments proposed for Categories M and C would be inspected periodically to determine if resource values are changing.

2. Forage would be provided for 12,588 mule deer and 1,666 pronghorn (optimum numbers) in herd unit areas in the long-term (30,234 and 2,852 AUMs, respectively, for a total of 33,086 AUMs). This would be an increase from the current 5,955 mule deer (14,281 AUMs) and 731 pronghorn (1,247 AUMs).

3. Watershed activity plans would be developed on 62,586 acres in the following areas (see Map 2-2): (a) Wind and Chess Draws in the Cornudas Mountains, (b) Moccasin and Otto Draws southwest of Pinon, (c) unnamed watersheds east of Tularosa and south of the Tularosa River, and (d) Three Rivers watershed north of Tularosa. The primary objectives of the watershed treatments would be to improve watershed values by reducing peak runoff rates, reducing sediment yields, improving water quality, and receiving better on-site utilization of runoff in the long-term.

4. The existing wild burro herd of 12 animals (144 AUMs) (2 years of age or older) would be maintained.

Issue 2 -- Special Management Areas (See Map 2-2)

1. Limit off-road vehicle (ORV) use to existing roads and trails on 62,586 acres of rangeland for protection of watershed values. Watershed activity plans would be developed for the following areas (see Map 2-2): (a) Wind and Chess Draws in the Cornudas Mountains, (b) Moccasin and Otto Draws southwest of Pinon, (c) unnamed watersheds east of Tularosa and south of Tularosa River, and (d) Three Rivers watershed north of Tularosa.

2. Improve and protect the riparian area along Percha Creek (320 acres) for wildlife habitat, watershed values, recreation, and visual quality. Fence to eliminate livestock grazing (3 miles of fence) and limit ORV use to existing roads and trails.

3. Designate 42 40-acre study plot exclosures, 1 for each of the 41 range sites and the pseudoriparian standard habitat site in Otero and Sierra Counties (1,680 acres). Fence the study plots from livestock (42 miles of fence) and close to ORV use. No allotment would have more than one exclosure.

4. Improve and protect Lake Holloman and adjacent lands (1,160 acres) as a high use area for waterfowl and shore birds. Eliminate livestock grazing.

5. Designate 3,640 acres of the Sacramento Escarpment as an Area of Critical Environmental Concern (ACEC) for visual resources. A Sacramento Escarpment ACEC management plan has been developed. The objectives of the plan are to enhance, protect, and prevent irreparable damage to the scenic and recreational values of the Escarpment. The complete text of the management plan is contained in Technical Report I, which is available for review in the White Sands Resource Area (WSRA) Office. (Technical Reports contain background information or supporting data for the RMP/EIS. A list of Technical Reports available is contained in Appendix K.) The ACEC would be managed as a Visual Resource Management (VRM) Class I and ORV use would be limited to existing roads and trails. In addition to the existing 3,270 acres designated No Surface Occupancy (NSO), an additional 370 acres would be designated NSO (for a total of 3,640 acres).

6. Limit ORV use to existing roads and trails for the Cornudas Mountains area (15,490 acres) for protection of visual resources.

7. Limit ORV use to existing roads and trails for the Three Rivers Petroglyph Site and Picnic Area (960 acres).

8. Designate the Rattlesnake Hill archaeological district (640 acres) closed to ORV use for protection of cultural resources.

9. Designate the Alamo Mountain petroglyphs area (200 acres) NSO and closed to ORV use for protection of cultural resources.

10. Limit ORV use to existing roads and trails for Lone Butte area (100 acres) for protection of cultural resources.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Las Cruces District Las Cruces NM

WHITE SANDS RESOURCE AREA

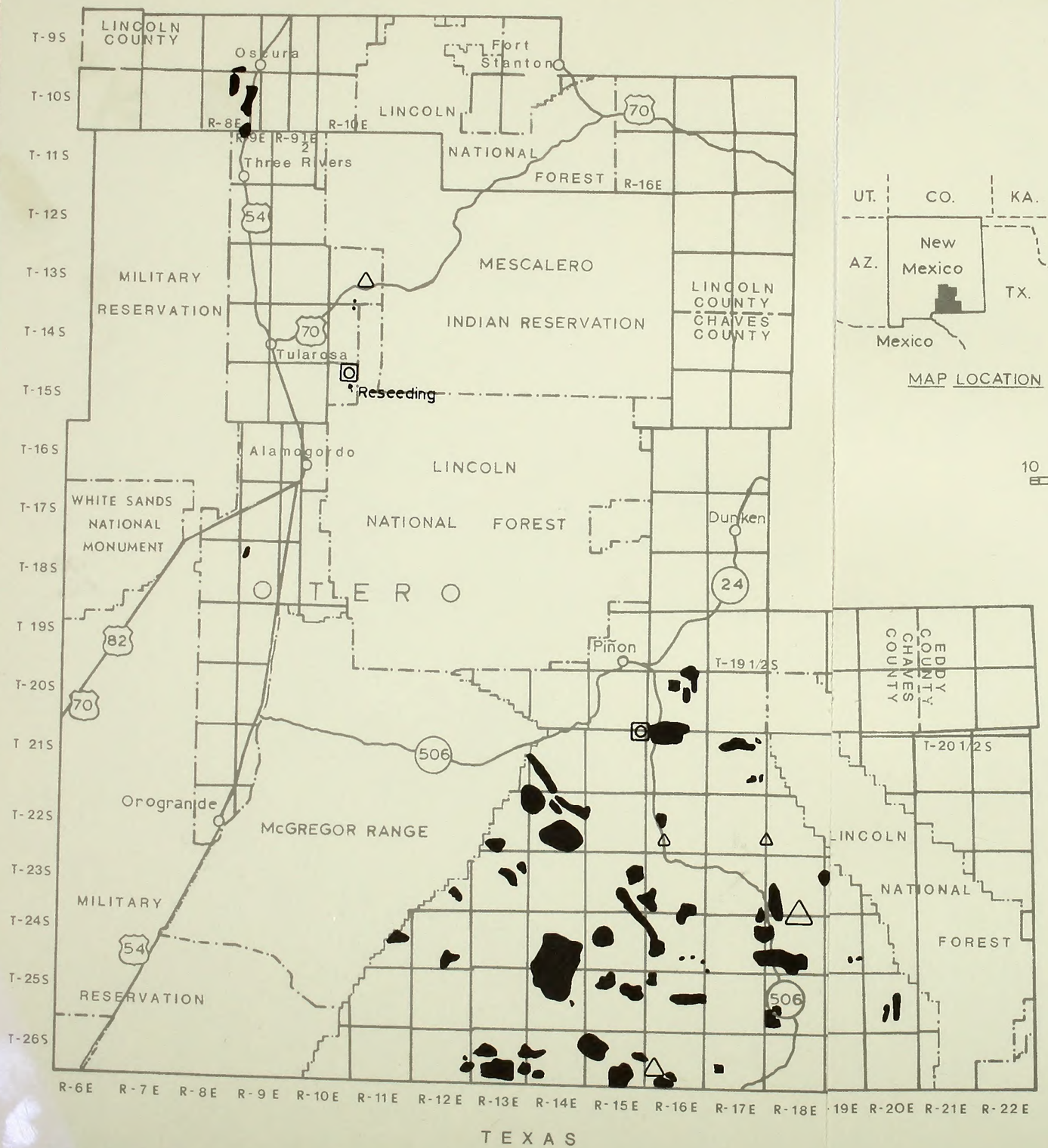
MAP 2-1

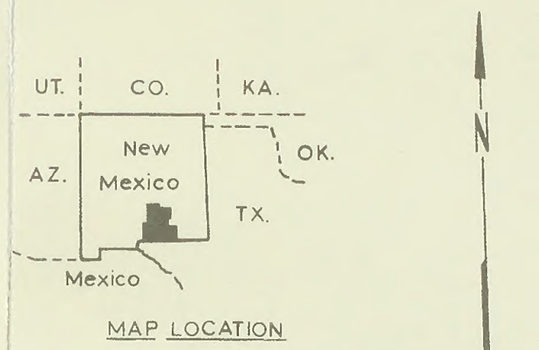
PROPOSED VEGETATION TREATMENT AREAS-BALANCED

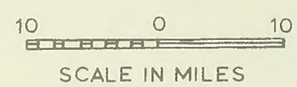
Burning

Reseeding

Brush Control



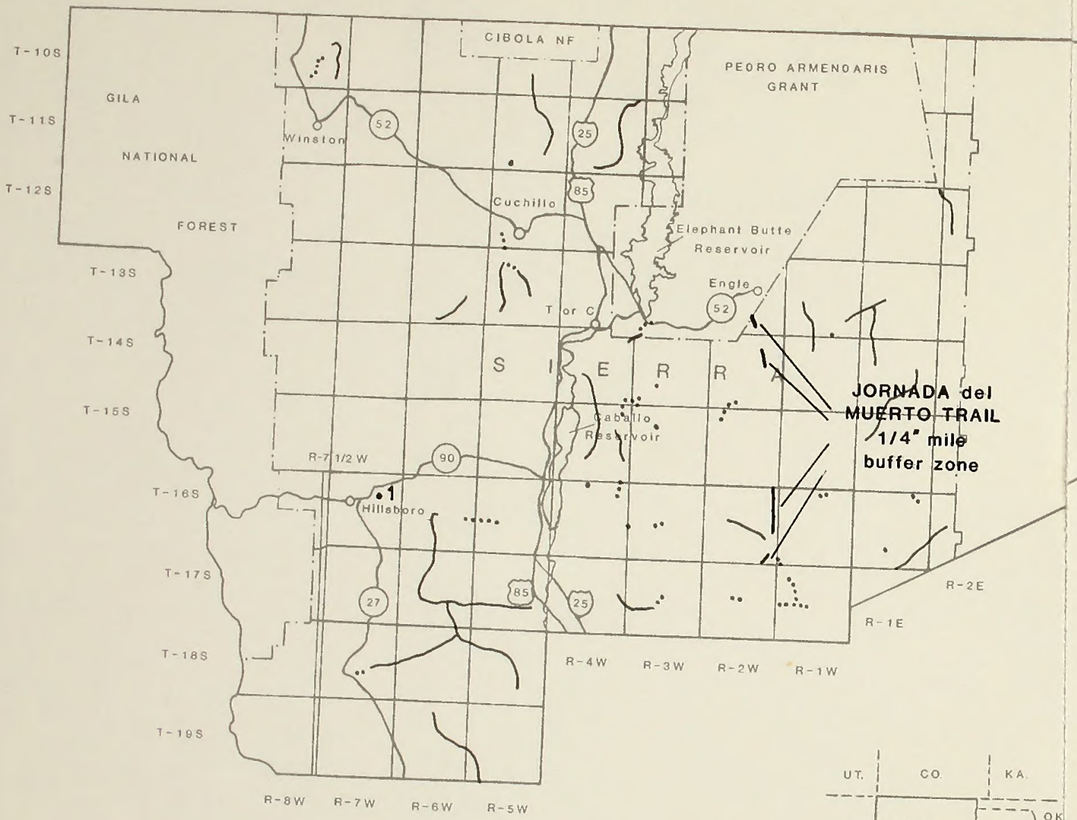


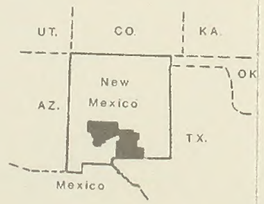


SOURCE: BLM Las Cruces District Files 1984.

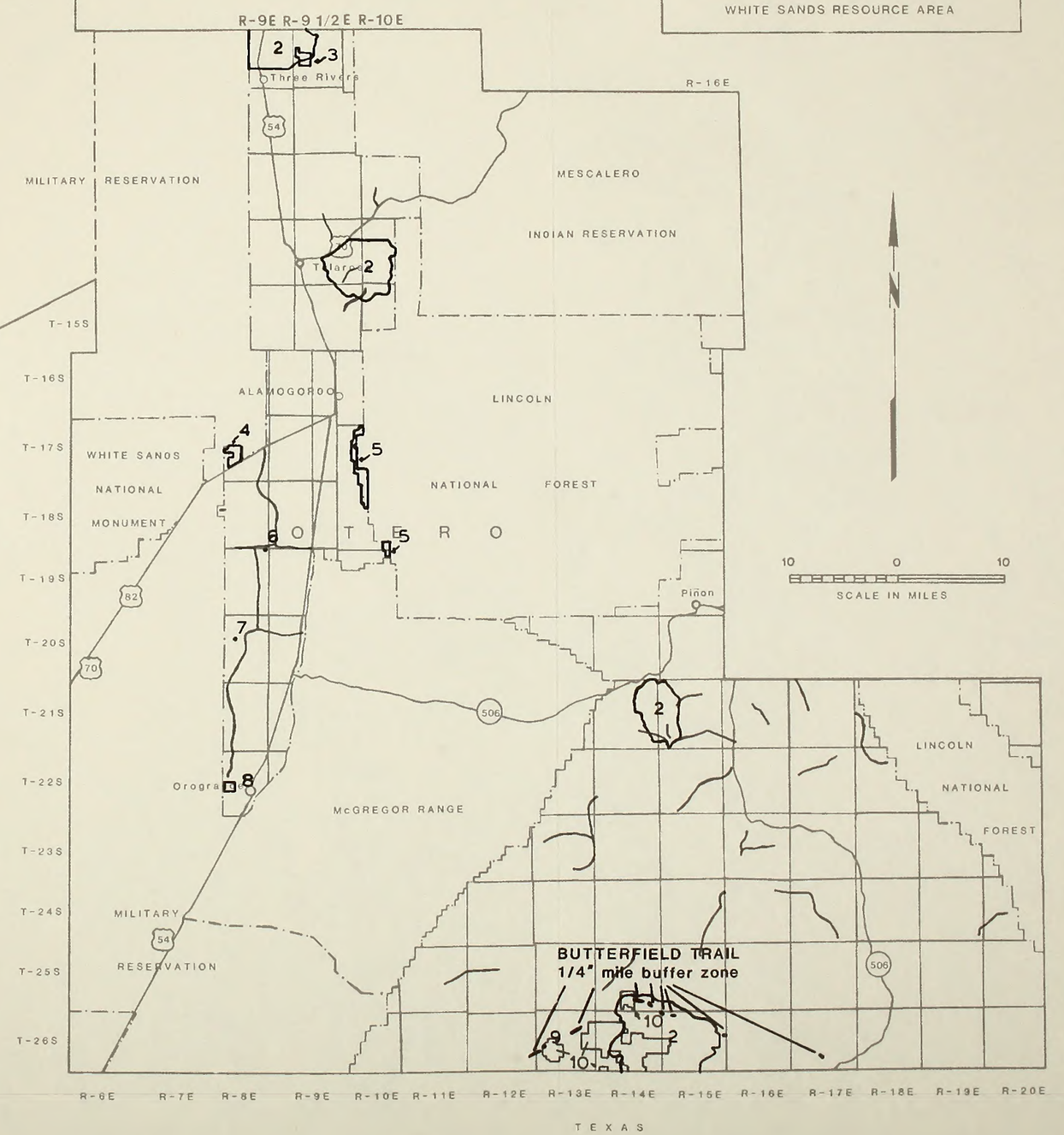
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Las Cruces District Las Cruces NM

WHITE SANDS RESOURCE AREA





MAP LOCATION



MAP 2-2

PROPOSED SPECIAL MANAGEMENT AREAS/ACCESS-BALANCED

1. Percha Creek Riparian Area (320 ac.)
2. Watershed Treatment Areas (62,586 ac.)
3. Three Rivers Petroglyph Site & Picnic Area (960 ac.)
4. Lake Holloman (1,160 ac.)
5. Sacramento Escarpment ACEC (3,640 ac.)
6. Lone Butte (100 ac.)
7. Jarilla Mountains (120 ac.)
8. Rattlesnake Hill Archaeological District (640 ac.)
9. Alamo Mountain Petroglyph Area (200 ac.)
10. Cornudas Mountain (15,490 ac.)

Proposed Access Needs

Roads

Easements

SOURCE: BLM Las Cruces District Files 1984.

MAP 2-2 Proposed SMAs/Access-Balanced

11. Designate a portion of the Jarilla Mountains (120 acres) closed to ORV use for protection of cultural resources.

12. Limit major surface disturbance activities to 1/4 mile from each side of well-preserved segments of the Butterfield and Jornada del Muerto trails on public land (2,220 and 1,252 acres, respectively).

13. For public land not designated as limited or closed, designate open to ORV use. The total acreage for each ORV designation for the Balanced Alternative would be: Open, 1,668,529 acres; Limited, 83,096 acres; and Closed, 2,640 acres.

Issue 3 -- Land Tenure Adjustment (See Visuals E and F in map pocket)

Consider for land tenure adjustment the following lands (45,000 acres) that have no known mining claim or threatened or endangered species conflicts (see Appendix A-1):

- -- Isolated and difficult to manage parcels.
- -- Lands needed for community expansion and public purposes.
- -- Lands where interest has been shown, including lands identified by the State of New Mexico for possible exchange.

Issue 4 -- Access (See Map 2-2)

Provide legal access to and across public land which currently has none to accommodate needs above the minimum to accomplish BLM's mandated workload. This would be accomplished by constructing 238 miles of new roads (of which 70 miles are proposed to be built to include grading and drainage, and 168 miles built to merely allow passage of vehicles). In addition, easements would be acquired on 36 miles of existing non-Federal roads (of which 16 miles would be improved to include grading and drainage).

Alternative II -- Production

Objective

The Production Alternative emphasizes making public land and resources available for use and development. Environmental values would be protected to the extent required by applicable laws, regulations, and policies; however, livestock forage production and land disposal would be favored.

Major Components

Issue 1 -- Rangeland Management

1. An intensive program of rangeland management would be initiated on all allotments (except Section 15 allotments) to achieve maximum forage production for livestock. The initial livestock forage use would be the same as the Balanced Alternative. It is assumed that initial authorized livestock AUMs would approximate the 5-year average

(135,261 AUMs) and not exceed preference (147,916 AUMs). The existing 8 AMPs would continue. Through chemical vegetation treatment on 145,115 acres, forage production would increase by 12,417 AUMs (from 147,916 AUMs to 160,333 AUMs) in the long-term (20 years). In addition, prescribed burning is proposed for 2,381 acres and seeding is proposed for 1,597 acres. (See Map 2-3 for location of vegetation treatments and Appendix C-2 for acres treated by allotment.) Livestock grazing systems would be implemented in cooperation with the livestock operator on all allotments (except Section 15 allotments). It is estimated that the following rangeland developments would be constructed (see Appendix D-6): 65 1/4 miles of pipeline; 67 3/4 miles of fence, 15 wells with pump or windmill, 13 storage tanks (20,000 gallons each), 38 drinking troughs, 9 earthen stock tanks, and 1 catchment. In the long-term (20 years), the projected livestock forage would be 191,003 AUMs as a result of vegetation treatments, grazing management treatments, and rangeland developments.

2. Forage would be provided for 5,955 mule deer and 731 pronghorn (current numbers) in herd unit areas in the long-term (14,281 and 1,247 AUMs, respectively, for a total of 15,528 AUMs).

3. Watershed activity plans would be developed on 62,586 acres in the following areas (see Map 2-2): (a) Wind and Chess Draws in the Cornudas Mountains, (b) Moccasin and Otto Draws southwest of Pinon, (c) unnamed watersheds east of Tularosa and south of the Tularosa River, and (d) Three Rivers watershed north of Tularosa. The primary objectives of the watershed treatments would be to improve watershed values by reducing peak runoff rates, reducing sediment yields, improving water quality, and receiving better on-site utilization of runoff in the long-term.

4. The entire wild burro herd would be removed through adoption. The wild burros would be captured and made available for adoption.

Issue 2 -- Special Management Areas

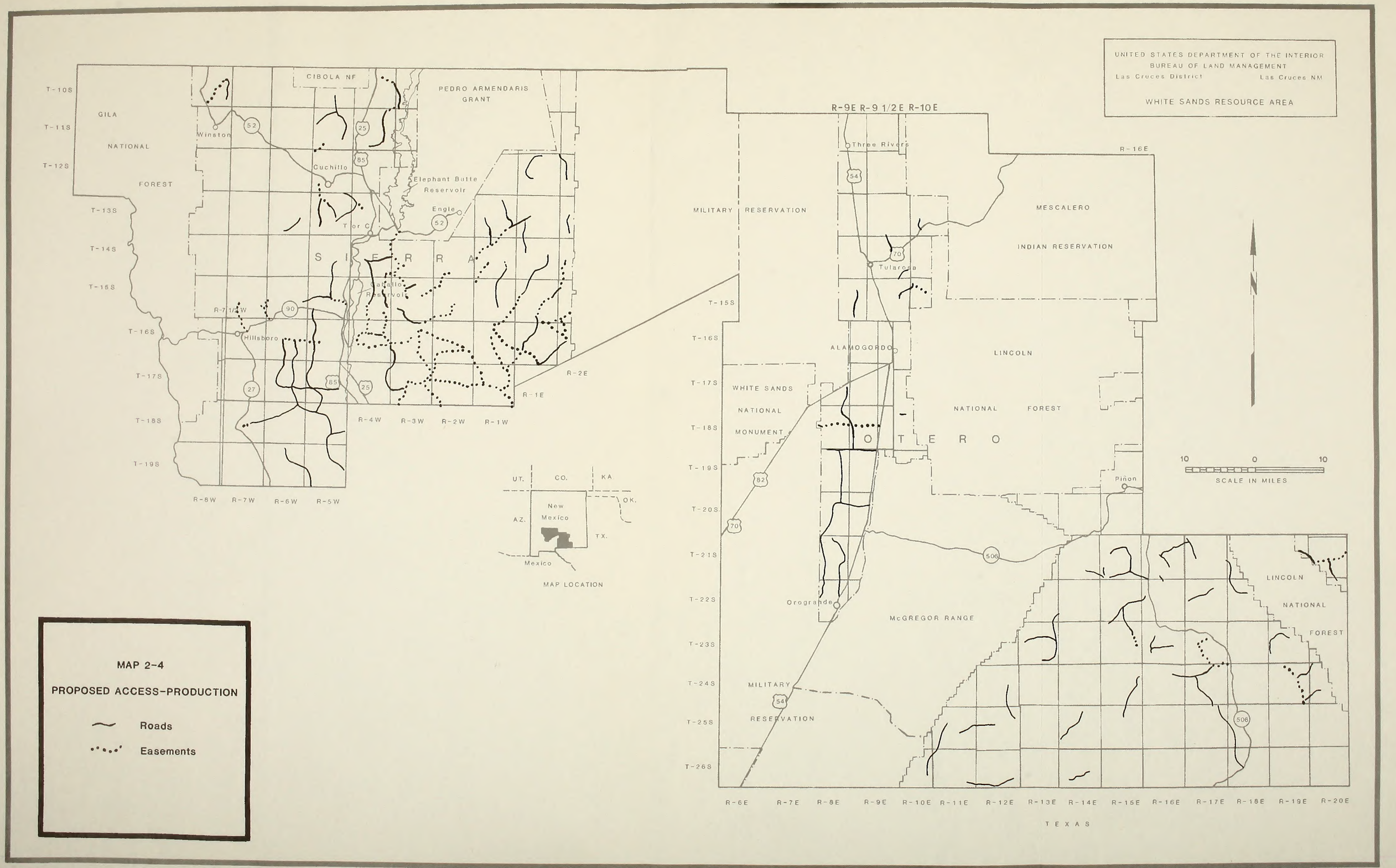
1. Designate 3 40-acre study plot exclosures, 1 for each of the three life zones in Otero and Sierra Counties (120 acres). Fence the study plots from livestock (3 miles of fence). No allotment would have more than one exclosure.

2. Designate all public land open to ORV use (1,754,265 acres).

Issue 3 -- Land Tenure Adjustment (See Visuals E and F in map pocket)

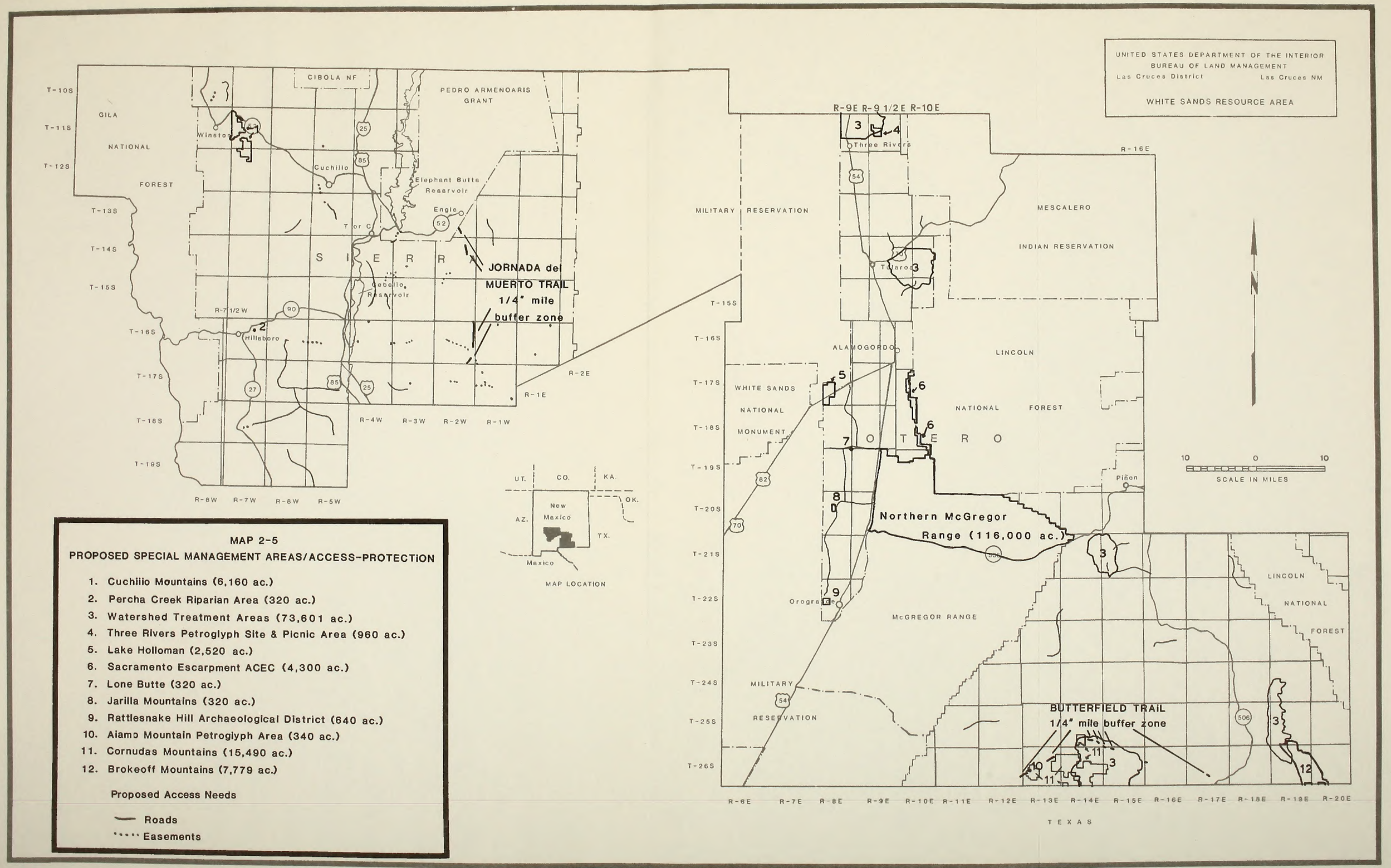
Consider for land tenure adjustment the following lands (58,000 acres) (see Appendix A-2):

-- All isolated and difficult to manage parcels.
-- All lands needed for community expansion and public purposes.
-- All lands where interest has been shown.



SOURCE: BLM Las Cruces District Files 1984.

MAP 2-4 Proposed Access-Production



MAP 2-5
PROPOSED SPECIAL MANAGEMENT AREAS/ACCESS-PROTECTION

1. Cuchillo Mountains (6,160 ac.)
2. Percha Creek Riparian Area (320 ac.)
3. Watershed Treatment Areas (73,601 ac.)
4. Three Rivers Petroglyph Site & Picnic Area (960 ac.)
5. Lake Holloman (2,520 ac.)
6. Sacramento Escarpment ACEC (4,300 ac.)
7. Lone Butte (320 ac.)
8. Jarilla Mountains (320 ac.)
9. Rattlesnake Hill Archaeological District (640 ac.)
10. Alamo Mountain Petroglyph Area (340 ac.)
11. Cornudas Mountains (15,490 ac.)
12. Brokeoff Mountains (7,779 ac.)

Proposed Access Needs

— Roads
····· Easements

SOURCE: BLM Las Cruces District Files 1984.

MAP 2-5 Proposed SMAs/Access-Protection

Management Plan to fence an additional 740 acres (for a total of 960 acres) from livestock grazing (6 miles of fence).

9. Designate the Rattlesnake Hill archaeological district (640 acres) closed to ORV use and closed to future rangeland improvements for protection of cultural resources.

10. Designate the Alamo Mountain petroglyphs area (340 acres) NSO, closed to ORV use, and closed to future rangeland improvements for protection of cultural resources.

11. Limit ORV use to existing roads and trails for the Lone Butte area (320 acres) for protection of cultural resources.

12. Designate a portion of the Jarilla Mountains (320 acres) closed to ORV use for protection of cultural resources.

13. Limit major surface disturbance activities to 1/4 mile from each side of well-preserved segments of the Butterfield and Jornada del Muerto trails on public land (2,220 and 1,252 acres, respectively).

14. For public land not designated as limited or closed, designate open to ORV use. The total acreage for each ORV designation for the Protection Alternative would be: Open, 1,524,355 acres; Limited, 220,310 acres; and Closed, 9,600 acres.

Issue 3 -- Land Tenure Adjustment (See Map 2-6)

Consider for land tenure adjustment the following lands (177,000 acres):

-- Lands needed for community expansion and public purposes.
-- Lands where interest has been shown.
-- Potential exchange lands.
-- Potential acquisition lands (23,000 acres). (See Appendix A-3.)

Issue 4 -- Access (See Map 2-5)

Provide legal access to and across public land which currently has none in order to accomplish the minimum of BLM's mandated workload. This would be accomplished by constructing 135 miles of new roads (of which 44 miles are proposed to be built to include grading and drainage, and 91 miles built to merely allow passage of vehicles). In addition, easements would be acquired on 30 miles of existing non-Federal roads (of which 15 miles would be improved to include grading and drainage).

Alternative IV -- No Action

Objective

The No Action Alternative reflects a continuation of current management direction and existing land use plan decisions. (Decisions

brought forward from previous land use plans are contained in Technical Report II.)

Major Components

Issue 1 -- Rangeland Management

1. Livestock forage use would be maintained at or about the existing preference level of 147,916 AUMs. It is not expected that the actual use would exceed the 5-year average of 135,261 AUMs. Current livestock grazing management would continue with no major adjustments. The 8 allotments (127,678 acres) which are currently under approved implemented AMPs would be managed intensively, while those not under AMPs (826,326 acres) would be managed as they are at present. No new rangeland improvements in direct support of the livestock grazing program would be proposed by BLM, except that Range Betterment Funds would continue to be expended on partially implemented AMPs.

2. Current management for wildlife would continue. Forage would be provided for 5,955 mule deer and 731 pronghorn (current numbers) in herd unit areas (14,281 and 1,247 AUMs, respectively, for a total of 15,528 AUMs).

3. Current management for watershed would continue. Existing structures would be maintained. New watershed treatments would only be implemented to prevent eminent danger to life, Federal investments, or life-supporting structures.

4. The existing wild burro herd would be maintained at approximately 12 animals (144 AUMs) (2 years of age or older).

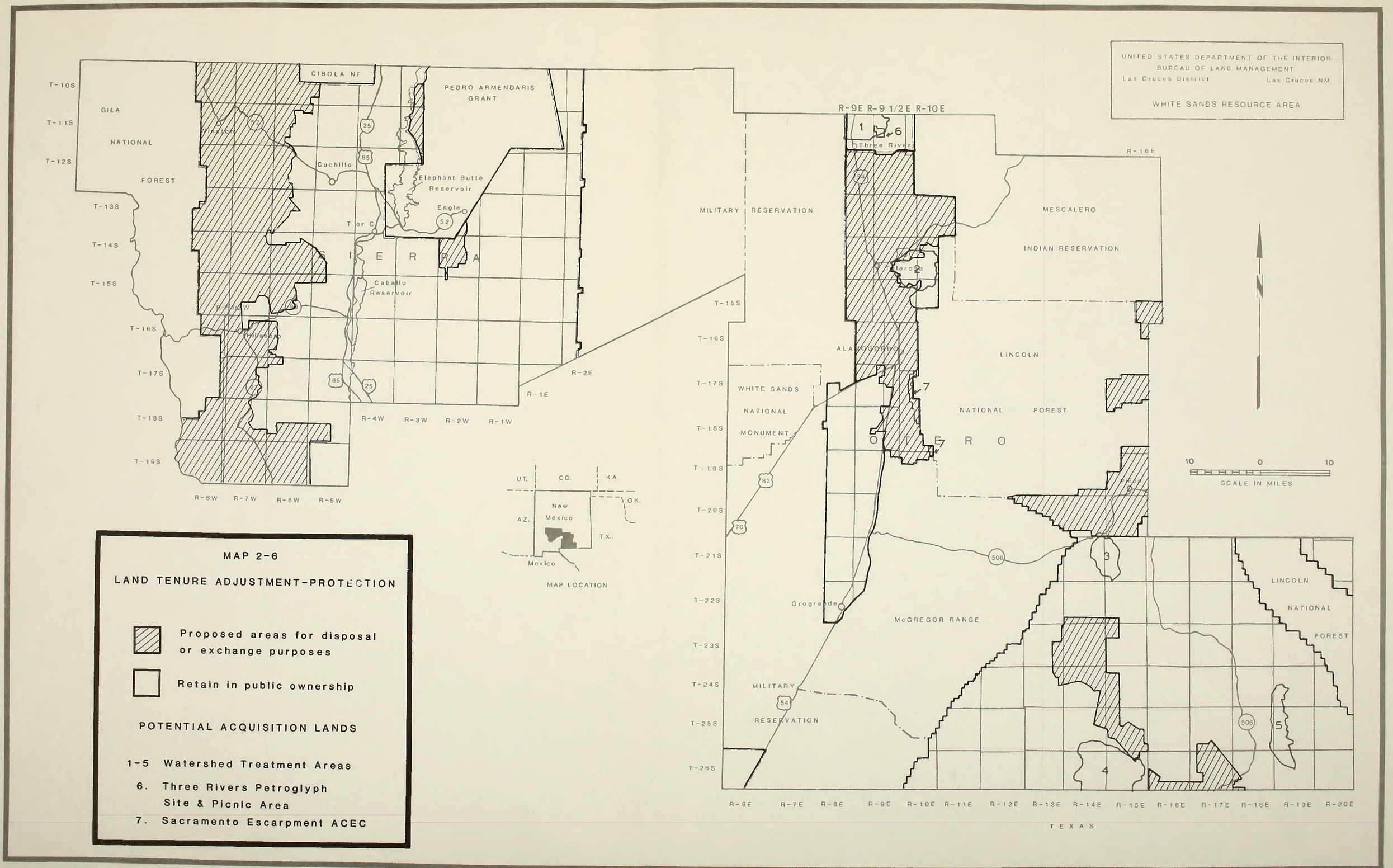
Issue 2 -- Special Management Areas (See Map 2-7)

1. No new special management areas would be designated. Current management would continue.

2. All public land not presently designated would continue to be undesignated for ORV use. Interim designations limiting ORV use to existing roads and trails would continue for McGregor Range north of State Road 506 (116,000 acres), the Three Rivers Petroglyph Site and Picnic Area (960 acres), and the Rattlesnake Hill archaeological district (640 acres). The total acreage for each ORV designation under the No Action Alternative would be: Open, 0 acres; Limited, 117,600 acres; Closed, 0 acres; and Undesignated, 1,636,665 acres.

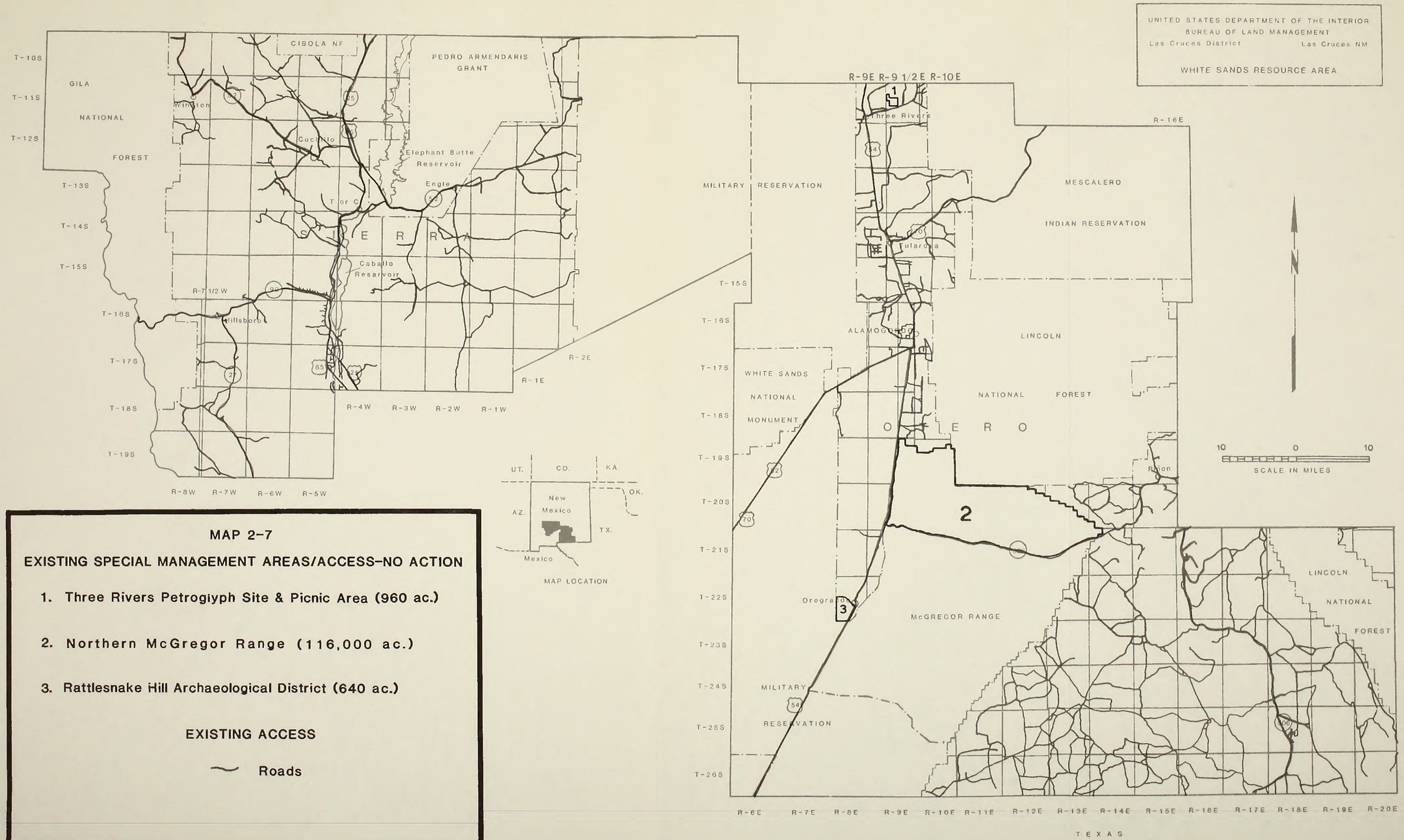
Issue 3 -- Land Tenure Adjustment

Proposals for land tenure adjustment would be processed and analyzed as they are proposed and received. Approximately 100 acres would be considered annually.



SOURCE: BLM Las Cruces District Files 1984.

MAP 2-6 Land Tenure Adjustment-Protection



MAP 2-7

EXISTING SPECIAL MANAGEMENT AREAS/ACCESS-NO ACTION

1. Three Rivers Petroglyph Site & Picnic Area (960 ac.)
2. Northern McGregor Range (116,000 ac.)
3. Rattlesnake Hill Archaeological District (640 ac.)

EXISTING ACCESS

Roads

SOURCE: BLM Las Cruces District Files 1984.

MAP 2-7 Existing SMAs/Access-No Action

Issue 4 -- Access (See Map 2-7)

No new roads would be proposed by BLM on public land. Easements for legal access would be acquired as needed.

Alternative V -- No Livestock Grazing

Objective

The No Livestock Grazing Alternative would eliminate livestock grazing from all public land.

Major Components

Issue 1 -- Rangeland Management

1. Livestock grazing would be eliminated on all public land. No livestock grazing permits or leases would be issued and all AMPs would be cancelled. No new rangeland developments would be constructed for livestock use and existing livestock developments would be abandoned or maintained only for nonlivestock resources. Some livestock developments could be removed at a later date as a result of activity plan implementation or identification of site-specific problems. Livestock facilities could be salvaged by the permittee. State and private lands intermingled with public land would have to be grazed in a manner to avoid livestock trespass on public land. The livestock operator would be responsible for avoiding trespass on public land. Trailing permits could be issued to authorize livestock travel across public land to National Forest, State, or private lands.

2. Forage would be provided for 12,588 mule deer and 1,666 pronghorn (optimum numbers) in herd unit areas in the long-term (30,234 and 2,852 AUMs, respectively, for a total of 33,086 AUMs). This would be an increase from the current 5,955 mule deer (14,281 AUMs) and 731 pronghorn (1,247 AUMs).

3. Watershed activity plans would be developed on 73,601 acres in the following areas (see Map 2-5): (a) Wind and Chess Draws in the Cornudas Mountains, (b) Moccasin and Otto Draws southwest of Pinon, (c) unnamed watersheds east of Tularosa and south of the Tularosa River, (d) Three Rivers watershed north of Tularosa, and (e) east of Crow Flats. The primary objectives of the watershed treatments would be to improve watershed values by reducing peak runoff rates, reducing sediment yields, improving water quality, and receiving better on-site utilization of runoff in the long-term.

4. The wild burro herd would be increased to 50 animals in the long-term (600 AUMs).

MANAGEMENT GUIDANCE COMMON TO ALL ALTERNATIVES

The following management guidance is applicable to, and thus constitutes a part of, all alternatives considered in detail. This section also contains mitigation measures and standard stipulations used to minimize environmental impacts. It also provides background information explaining how the plan fits into program actions.

Decisions from the Southern Rio Grande Management Framework Plan (MFP) (BLM 1981), the Southern Rio Grande Rangeland Program Summary (1982), the Mesa MFP (BLM 1970), the McGregor Rangeland Management Program Document, the White Sands Oil and Gas Record of Decision, and the Mineral Material Disposal Record of Decision have been carried forward in this section where applicable. (Decisions brought forward from these previous land use plans and decision records are contained in Technical Report II.) The Southern Rio Grande MFP covered Sierra County and the Mesa MFP covered the southeastern portion of the Resource Area in Otero County.

When approved, this Resource Management Plan (RMP) will supercede all previous decisions.

Lands

Public land will be considered for disposal when (a) the lands are determined to be no longer required for a Federal project or a resource management activity; (b) disposal of the lands will serve important public objectives; or (c) the lands are isolated and difficult to manage under present BLM management. Disposal of the public land may be accomplished by sale, exchange, or Recreation and Public Purpose (R&PP) patent pursuant to applicable Federal authority, such as Section 203 of the Federal Land Policy and Management Act of 1976 (Public Law 94-579) or the Recreation and Public Purposes Act (43 United States Code 869 et. seq.).

Items to be examined while considering the merits of any disposal or acquisition action include:

1. Consistency and Conformance
2. Threatened or Endangered Plant/Animal Species and Their Habitat
3. Wilderness Values
4. Prime and Unique Farmlands
5. Floodplain/Flood Hazard Evaluation
6. Cultural and Paleontological Resource Values
7. Visual Resources
8. Areas of Critical Environmental Concern
9. Wetlands
10. Existing Rights and Uses
11. Controversy
12. Health and Safety
13. Mineral Resources
14. Adjacent Uses and Ownership

Additionally, for disposals or acquisitions by exchange, other items to be considered would include:

1. Is the exchange in the public interest?
2. Are the lands being offered of comparable value to the public land selected?

There is a general goal to consolidate public land holdings in a blocked-up pattern of land ownership. The areas shown on Map 2-6 are flexible and may be adjusted via disposals and acquisitions consistent with the Memorandum of Understanding dated October 3, 1984, between BLM and the New Mexico State Land Office, and subsequent documents. This would be done in order to allow BLM to efficiently carry out its management of the public land. Priorities for blocking up would include wilderness study areas, wildlife habitat, watersheds, land treatment areas, grazing administration, cultural values, and other resource considerations.

Support for land disposal and acquisition actions would include cadastral survey, appraisal, and conflict resolution. Site-specific land reports and Environmental Assessments (EAs) would be completed prior to any disposal or acquisition.

Some lands (about 3,180 acres) are currently being offered or considered for disposal based on decisions in the Southern Rio Grande MFP (BLM 1981) and the Mesa MFP (BLM 1970). (See Technical Report II.) Further information on these lands is available in the WSRA Office.

Other lands-related activities that may occur in addition to sales, exchanges, easement acquisitions, and R&PP patents include: (a) R&PP leases; (b) permits, leases, and easements; (c) rights-of-way; (d) withdrawals and withdrawal reviews; (e) classifications; and (f) other activities necessary to accomplish BLM's mandated tasks.

Access

Road maintenance and easement acquisition will continue to be conducted in support of resource management objectives, subject to available funds. Roads or trails will be constructed only where existing roads and trails could not be used or where off-road travel is not possible because of topography or terrain. Construction, maintenance, and easement acquisition requirements and priorities will be determined on a yearly basis, as a part of the annual work planning process.

Specific road construction and maintenance standards will be determined on a case-by-case basis, dependent upon resource management needs; user safety; impacts to environmental values (including but not limited to wildlife habitat, soil stability, recreation, and scenery); and construction and maintenance costs. Transportation plans will be developed on a county-by-county basis in the next few years. Support for access actions would include cadastral survey and appraisals.

Energy and Minerals

Oil, Gas, and Geothermal Leasing

Oil, gas, and geothermal leasing in the Resource Area was analyzed in a programmatic EA completed in 1981 (BLM 1981). Minerals decisions carried forward from previous documents are contained in Technical Report II. In general, public land is available for oil and gas and geothermal leasing. Usually, leases will be issued with only standard stipulations attached. Some situations require that leases have special stipulations attached to protect sensitive resource values. In highly sensitive areas where special stipulations are not sufficient to protect important resource values, no surface occupancy stipulations will be attached to the lease or leasing will not be allowed. Oil and gas and geothermal drilling is evaluated on a case-by-case basis through the EA process.

Locatable Minerals

Public land is generally open to mineral entry and development except for specific areas withdrawn from mineral location. These areas are noted on the Master Title Plats available for review at the Las Cruces District Office. Mineral exploration, development, and production on public land is regulated under Title 43 Code of Federal Regulations (CFR) Part 3800 to prevent unnecessary and undue damage to the surface resources.

Examinations of mining claims to determine their validity may be initiated under the following conditions:

1. where a mineral patent application has been filed and a field examination is necessary to determine the validity of the claim(s);

2. where there is a conflict with a land disposal application, and it is determined to be in the public interest to do so, or where the statute authorizing the disposal requires clearance of any encumbrance;

3. where the land is needed for a Federal program; or

4. where a claim is located under the guise of the mining law and flagrant unauthorized use of the land or mineral resource is occurring.

Common Variety Mineral Materials

Applications for the removal of common variety mineral materials, including sand and gravel, are processed on a case-by-case basis. Stipulations to protect important resource values are attached based on an interdisciplinary environmental review of each proposal, or, in the case of designated community pits, a one-time review of the pit area. A programmatic EA for mineral material disposal in the Las Cruces District was prepared in 1979 (BLM 1979).

All Minerals

Prior to the disposal of any parcel of public land, whether surface only or surface and subsurface (mineral estate), a mineral report must be completed. Depending upon the type of disposal proposed, the report may be required to assess the mineral potential or mineral character of the involved lands or determine if disposal of the surface will interfere with development of the mineral estate. Recommendations are made concerning the suitability of the parcel for disposal based upon the findings of the report. In this way, impacts to mineral exploration and development resulting from land disposal are minimized.

Minerals decisions which have been carried forward from previous documents are contained in Technical Report II.

Soils, Water Resources, and Air Quality

General

Soil, water, and air resources will continue to be evaluated on a case-by-case basis through the EA process as part of project level planning. The evaluation will be site-specific to the particular proposal or project and will consider the sensitivity of the soil, water, and air resources in the affected area. Stipulations will be attached as appropriate to ensure compatibility of projects to soil, water, and air resource management.

Special management plans will be written within constraints established in the RMP/EIS for such topics as fire or flood rehabilitation, restoration of disturbed areas, municipal watershed management, and watershed research projects, as needed.

Soils

Soils will be managed to maintain productivity and minimize erosion. Current soils information will be obtained when necessary to support the various planning and multiple-use management activities.

Management activities in areas of high erosion potential will be designed to minimize surface disturbance to the extent possible. In addition, areas of soil disturbance will be reclaimed.

Soils management will include coordination with the related programs of State, local, and other Federal agencies.

Water Resources

Water quality will be maintained or improved to meet standards (see Appendices B-2 and B-3) in accordance with applicable State and Federal pollution control laws (such as the Clean Water Act of 1977, Executive Order 11752 (December 1973), and Executive Order 11988 (May 1977). This will include consultation with State agencies on proposed projects that may

significantly affect water quality. Current information on water resources will be obtained when necessary to support management activities.

Management actions affecting riparian zones (Tularosa and Sacramento Rivers) and floodplains will be designed to maintain or, where possible, improve hydrologic functions in accordance with Bureau policy.

Water rights will be acquired or perfected as necessary to carry out public land management purposes through State law and administrative claim procedures, except as otherwise specifically mandated by Congress.

Air Quality

Activities that may affect air resources will be conducted to prevent significant deterioration of air quality. All activities will be done in accordance with applicable State and Federal air quality laws and regulations including the State implementation plan.

Rangeland Management

Allotment Categorization

All grazing allotments in Otero County have been assigned to one of three management categories based on present conditions, potential for improvement, whether other resource conflicts exist, and opportunities that exist for positive economic return on public investments. (See Appendix D-1.)

Category M allotments generally are in satisfactory resource condition; I allotments generally have the potential to improve resource conditions and resolve resource conflicts; and C allotments generally have low resource production potential and are producing near their potential.

Any management associated with these categories would not apply under the No Action and No Livestock Grazing Alternatives.

Allotment-Specific Management Actions for the Category I Allotments

Multiple-use management actions will be developed for each allotment in Category I varying with each alternative. (See Appendix D-1.) Activity plans would be prepared within constraints set by this RMP/EIS to resolve resource conflicts where they occur. These activity plans would specifically define the following:

1. Identification of the resource conflict

2. Management goals and objectives

3. Level of management necessary to achieve the stated goals and objectives

4. Planned rangeland improvements

5. Method of evaluation

The activity plan on an affected allotment would favor the development or enhancement of the significant values found to be in conflict with grazing management. The significant values found within the area are:

1. Riparian areas

2. Areas where threatened or endangered species (plants or animals) may occur

3. Crucial mule deer or pronghorn habitat (See Map 3-4)

Category I would incorporate grazing treatments to meet management objectives and goals spelled out in each alternative that would be individually designed for each allotment. The grazing objectives would include, but would not be limited to, desired changes in species composition, improved rangeland and watershed condition, accommodation of physiological needs of plants, and to realize a beneficial return of dollars expended in achieving the overall management objectives. However, the priorities assigned to achieve objectives for wildlife habitat, watershed, vegetation condition, and livestock forage production differ between alternatives.

Monitoring

Initial stocking rates are based upon the best data currently available. Close monitoring of grazing systems and progression toward improvement are needed for BLM to be able to make periodic adjustments. A monitoring program will be established in Otero County to determine whether the goals and objectives of the RMP are being effectively achieved under current management. When undesirable and unintended changes in resource values are discovered and the causes are determined, corrective action will be taken. The Final Grazing Management Policy and the BLM New Mexico Rangeland Studies Handbook (1984) discuss the applications of rangeland monitoring in more detail.

As a minimum, the monitoring studies would be designed to collect data on actual livestock use, wildlife use, degree of key forage species utilization, climatic conditions, and rangeland ecological condition and trend.

Monitoring would not be necessary under the No Action and No Livestock Grazing Alternatives.

Livestock Use Adjustments

Livestock use adjustments are most often made by changing one or more of the following: the kind and class of livestock grazing the allotment, the season of use, the stocking rate, or the grazing pattern.

Any future requests for changes in kind of livestock would be analyzed through EAs on an individual basis. While most livestock use adjustments will occur in Category I allotments, use adjustments may occur for allotments in Categories C and M, if resource conflicts arise.

In reviewing the estimated initial stocking rate and other recommended changes, it is emphasized that the proposed AUM figures are not final stocking rates. Rather, all livestock use adjustments will be implemented through documented mutual agreement or by decision. When adjustments are made through mutual agreement, they may be implemented once the Rangeland Program Summary has been through a public review period. When livestock use adjustments are implemented by decision, it will be based on livestock operator consultation, range survey data, and resource condition monitoring. Current BLM policy emphasizes the use of a systematic monitoring program to verify the need for livestock adjustments instead of using one-time inventory data.

The Federal regulations that govern changes in livestock forage provide specific direction for livestock use adjustments implemented by decision (43 CFR 4110.3-1, 43 CFR 4110.3-2, and 43 CFR 4110.3-3). The regulations specify that "permanent increases in the allocation of livestock forage or suspensions of preference shall be implemented over a 5-year period, unless after consultation with the affected permittees or lessees and other affected interests, an agreement is reached to implement the increase or suspension in less than 5 years."

After consultation, coordination, and cooperation, suspensions of preference shall be implemented through a documented agreement or by decision. If data acceptable to the BLM Area Manager are available, an initial reduction shall be taken on the effective date of the agreement or decision and the balance taken in the third and fifth years following the effective date. If data are not available to support an initial reduction, additional data will be collected through monitoring. Adjustments based on the additional data shall be implemented by agreement or decision that will initiate the 5-year implementation period.

Livestock use adjustments would not apply under the No Action Alternative.

Grazing Systems

Types of grazing systems to be implemented will be developed in cooperation with the livestock operator and based on consideration of the following factors: allotment-specific management objectives; resource characteristics, including, but not limited to, soil and vegetation potential and water availability; other BLM management objectives; operator needs; and implementation costs. Typical grazing systems available for consideration are found in the Agriculture Experiment Station Research Report 467, Characteristics of Grazing Systems (Gray et al. 1982).

Rangeland Improvements

Typical rangeland improvements are described in Appendices C-1 and C-2 for vegetation treatments and D-5, D-6, and D-7 for rangeland developments. The extent, location, and timing of such actions will be based on the allotment-specific management objectives adopted through the resource management planning process, interdisciplinary development and review of proposed actions, contributions from operators and others, and BLM funding capability.

All rangeland improvements for which funds are to be spent will be subjected to an economic analysis, which will be used to develop a final priority ranking of allotments to commit the rangeland improvement funds that are needed to implement activity plans. The highest priority for implementation generally will be assigned to those improvements for which the total anticipated benefits exceed cost (BLM Washington Office Instruction Memorandum 83-27).

When rangeland improvements are implemented on public land, the BLM will adhere to procedures and design specifications to protect resources as mandated by laws, executive orders, regulations, manual requirements, and policies. This RMP/EIS analyzes cumulative impacts of proposed rangeland improvements. However, prior to implementation, site-specific EAs would be prepared to analyze the impacts from projects if implemented.

A threatened, endangered, State-listed, or sensitive species clearance will be conducted by a BLM authorized officer prior to the beginning of any project. If a "may affect" determination is made, consultation will be undertaken with the U.S. Fish and Wildlife Service (USFWS), New Mexico Department of Game and Fish (NMDGF), or the New Mexico State Heritage Program listing the species which may be affected. The results of the consultation will determine the course of action necessary to avoid adverse effects on listed species or their habitat.

Rangeland improvements are discussed specifically for each alternative with the exception of the No Livestock Grazing Alternative.

Maintenance of Rangeland Developments

Maintenance of rangeland developments on public land is subject to policies and guidance contained in Washington Office Instruction Memorandum 83-27. Livestock watering facilities, fences, and cattleguards constructed primarily for livestock management would be routinely maintained by permittees unless specific arrangements are made to the contrary. Nonstructural improvements will be maintained by the BLM. Disturbance of vegetation at all project sites will be held to a minimum. All refuse will be removed from work areas on public land and be disposed of in approved sanitary landfills. The permittees' obligation would be periodic inspections, routine maintenance, and reporting of major damage, malfunction, or complete system failure.

Chemical Vegetation Treatment

Several herbicides currently labeled and approved by the Environmental Protection Agency and the New Mexico Department of Agriculture for use on rangelands in the State of New Mexico are proposed for use in controlling brush. Proposals will vary among the alternatives. The goal of these herbicide treatments is to decrease the target species, resulting in an increase in more desirable plant species. The four herbicides proposed for use are Dicamba (3,6-dichloro-o-anisic acid), Picloram (4-Amino-3,5,6-trichloropicolinic acid), Tebuthiuron (N-[5-(1,1-dimethylethyl)-1,3,4-triadazol-2-yl]-N,N^1-dimethylurea), Triclopyr (3,5,6-Tricloro-2-pyridinyl-oxyacetic acid) or a combination of two or more of the above. The rate of application by herbicide and vegetation species is shown in Table 2-1.

TABLE 2-1
RATES OF APPLICATION FOR CHEMICAL HERBICIDES

Primary Species	Chemical	Rate of Application
Mesquite	Picloram and Dicamba	.25-1.50 lbs. AI/Ac
Mesquite	Triclopyr	4-8 qts. AI/Ac
Mesquite	Tebuthiuron	.50-1.25 lbs. AI/Ac
Creosotebush	Tebuthiuron	.50-.75 lb. AI/Ac

Source: BLM Las Cruces District Office Files, 1984.

Note: AI/Ac -- Active ingredient per acre

The use of chemical herbicides will follow the vegetation treatments guidelines in Appendix C-3. Chemical treatment will consist of applying approved chemicals to control target species of plants. Before chemicals are applied, the BLM will meet or exceed EPA standards. All chemical applications will be preceded by an approved Pesticide Use Proposal. All applications of pesticides will be under the supervision of a certified pesticide applicator and will be carried out in compliance with the New Mexico pesticide laws. Dowco 290 is currently being evaluated by the State of New Mexico and could be used when and if labeled. If other herbicides effective on mesquite or creosotebush are approved prior to the proposed vegetation treatment, they would be considered for use.

All application rates of herbicides would be determined based on individual range sites and the conditions at the time of application. Deferral of livestock use would be in effect for a minimum of two growing seasons following brush control projects so vegetation may be reestablished. A site-specific EA would be prepared prior to vegetation treatments to determine the impacts. Directions for use, and precautions during use, would follow those set by the manufacturers of the herbicides.

Burning

Burning is proposed to reduce the amount of undesirable plant species on a site. Burning will normally be done during April-May or September-October, depending on the specific prescription written for each area, desired results, weather, and moisture conditions. Fire management plans will be developed within constraints established by the RMP/EIS before any prescribed burning occurs.

Interseeding/Seeding

Interseeding consists of scalping a furrow to remove perennial and annual competition and seeding adapted, vigorously competitive species in the center of the furrow. A seed dribbler used with a crawler tractor, small scalper/seeder, or range drill would be used to interseed strips. Broadcast seedings could be used as well. Species to be seeded would be selected to meet management objectives developed for a specific allotment.

A mixture of seeds of species adaptable to the area will be used where seeding is done following construction of rangeland development projects or vegetation treatments. The time and method of seeding prescribed by BLM standards will be used to achieve the best results for the intent of the seeding. A typical seed mixture which could be used on sandy loam sites within the lower elevations of the Resource Area is shown in Table 2-2.

TABLE 2-2
SEED MIXTURE

Species	Pounds of Seed Per Acre	
	Drilling	Broadcasting
Black grama	1 1/2	3
Fourwing saltbush	3 1/2	7
Sideoats grama	5	10
Lehmann lovegrass	1/8	1/4
Globemallow	1/4	1/2

Source: BLM Las Cruces District Office Files, 1984.

Other forb species will be considered if a good source is available. Livestock grazing will be excluded from all newly seeded areas for a minimum of two growing seasons to allow seedlings to become established. Grazing may be allowed between the first and second growing seasons. This would not apply to small areas such as pipelines. Interseeding/seeding proposals vary among alternatives.

Wild Burros

A Herd Management Area Plan will be prepared within constraints established by the RMP/EIS for the burro herd. The plan will be prepared in consultation with affected and interested groups and individuals, and in coordination with affected Federal Agencies and State wildlife agencies. The plan will be coordinated with other BLM resource plans and uses which may be impacted. Future management actions will be tailored to meet these objectives. However, the priorities assigned to achieving objectives differ between alternatives. This information does not apply to the Production Alternative.

Wildlife

Wildlife and wildlife habitat will continue to be considered and evaluated during site-specific planning for all types of projects. Such evaluations will include consultations with the NMDGF as provided in a Memorandum of Understanding dated October 1978. Stipulations developed through consultation with the NMDGF for each project will be attached to project authorizations to improve compatibility of projects with management objectives and guidance for wildlife and wildlife habitat. Habitat improvement projects will be implemented where necessary and as funded to maintain or improve habitat conditions. Such projects will be identified through Habitat Management Plans (HMPs), Coordinated Resource Management Plans (CRMPs), Sikes Act comprehensive plans, or other appropriate wildlife planning documents. EAs will be completed before starting construction of any project.

Terrestrial Wildlife Habitat

Forage allotments will be made for big game species on herd unit areas for present populations as established jointly with the NMDGF. It is assumed that game cover requirements will be met by limiting utilization of vegetation to provide for the physiological needs of the plants. Any specific cover management needs will be addressed in activity plans.

Rangeland improvements will be designed to provide for wildlife needs. Livestock water developments will be designed to permit use and escape by wildlife species. Where BLM controls the water source, water will be available yearlong. New fences will be constructed according to the guidance contained in New Mexico State Office Manual Supplement 1737, which includes designs to permit free movements of big game animals in occupied and historic ranges. Existing fences will be modified, as the need is identified in activity plans, to conform with New Mexico State Office Manual Supplement 1737.

Vegetation treatment projects will be designed to minimize impacts on wildlife and to improve habitat, especially for pronghorn, whenever project and wildlife objectives are compatible. During nesting season, a raptor inventory will be conducted on areas proposed for vegetation treatment to identify and flag land within a 1/4 mile radius of active nests so they will not be disturbed by the proposed treatment.

Animal damage control activities will be established in an annual plan completed for the Las Cruces District. The District Animal Damage Control Plan includes rodent and predator control activities conducted by the USFWS.

HMPs (or a CRMP) will be developed for the Alamo Mesa pronghorn area, Caballo Mountain deer area, and Sacramento Escarpment deer area. The primary objective for each of the above HMPs will be to provide habitat for the featured species (mule deer or pronghorn). The HMPs will provide for additional habitat management such as fence modifications and water developments. Monitoring programs will be established to ensure that objectives are met. Additional objectives and featured species may be identified as the HMPs are developed.

An additional HMP is being considered for approximately 524 acres of riparian habitat within the Resource Area which is located primarily north of Alamogordo in Otero County. Exact locations are shown on maps available in the Las Cruces District Office. The policy given in Manual 6740--Wetland-Riparian Area Protection and Management, will provide the basis for management of all riparian areas and will also be used as guidance in management of pseudoriparian sites. The actions necessary to conform to policy have not been determined but could vary from vegetation manipulation to exclusion of livestock grazing. The objective would be to enhance riparian or pseudoriparian areas.

Aquatic Habitat

Lake Holloman receives treated sewage from Holloman Air Force Base (AFB) and is currently unsuitable for management as aquatic habitat. If water quality conditions at the Lake improve sufficiently, a HMP for aquatic habitat will be prepared. Any plan would include coordination with Holloman AFB and the NMDGF.

Threatened, Endangered, and Sensitive Species

The NMDGF and USFWS will be consulted prior to implementing projects that may affect listed species or their habitat. These consultations will be conducted according to the Endangered Species Act and management policy and guidelines.

Management activities in habitat for threatened, endangered, or sensitive species will be designed to benefit those species, or at least minimize any potential adverse influence of the activity on the species. Listed species which occur within HMP areas, and for which management needs are known, will be included in the HMP as a featured species.

Seasonal Restrictions

Seasonal restrictions are sometimes necessary for site-specific activities, such as not allowing an action to occur within a specific area during raptor nesting season. These restrictions are determined on a case-by-case basis and could consist of not allowing motor vehicles within 1/4 mile of raptor nests, for example.

Recreation

A wide range of recreation opportunities would be provided for all segments of the public. Impacts to recreation opportunities would continue to be evaluated on a case-by-case basis when EAs are written for specific projects or proposals.

Areas not designated in an alternative as limited or closed would remain open for ORV use. During the ORV designation process, restrictions and closures would be established for specific roads, trails, and areas as identified in the five alternatives. Interim or emergency ORV designations could be implemented in problem areas, if necessary.

Specific locations in the Resource Area would be monitored by the BLM during the deer hunting seasons. These areas include, but are not limited to, the San Andres, Brokeoff, Cornudas, Caballo, and Cuchillo Ranges, and the foothills of the Sacramento and Guadalupe Escarpments. During the hunting seasons, hunters' vehicles will be limited to existing roads and trails by the New Mexico Department of Game and Fish under State law.

The area around the Jarilla Mountains would continue to be available for organized ORV events.

Approximately 960 acres of surface and 840 acres of subsurface of the Three Rivers Petroglyph Site and Picnic Area will continue to be withdrawn under the Classification and Multiple Use (C&MU) Act to protect cultural and recreation values.

Visual Resources

Visual resources will continue to be evaluated as a part of activity and project planning. Such evaluation will consider the significance of the proposed project, the visual sensitivity of the affected area, and the projected impacts of the project. Stipulations will be attached as appropriate to ensure compatibility of projects with management objectives for visual resources. (See Map 3-6.)

The exact visual impact of each development or treatment would be determined from site-specific EAs prior to implementation. Contrasts would be minimized to a degree that is compatible with the VRM class of the area in which the contrasts occur.

Wilderness

The Brokeoff Mountains, Culp Canyon, and Jornada del Muerto Wilderness Study Areas (WSAs) will continue to be managed in compliance with the Interim Management Policy and Guidelines for Lands Under Wilderness Review (BLM 1979 and 1983) until they are reviewed and acted upon by Congress. Actions identified in an alternative will only be implemented if they satisfy the nonimpairment criteria.

Public land within areas added by Congress to the National Wilderness Preservation System will be managed in compliance with the Wilderness Management Policy (BLM 1981). Site-specific wilderness management plans will be developed for designated wilderness areas.

Areas reviewed by Congress but not added to the National Wilderness Preservation System will be managed in accordance with other applicable guidance provided by this RMP/EIS.

Cultural Resources

Cultural resources will continue to be inventoried and evaluated prior to surface disturbing activities. Attempts will be made to avoid adverse impacts to the cultural resource, where this is not possible consultation will be made with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation to develop mitigative tactics based on the BLM cultural use evaluation system and in accordance with the Grazing Programmatic Memorandum of Agreement. Conflicts will be resolved in accordance with 36 CFR 800 and the Memorandum of Agreement between the New Mexico SHPO and the BLM.

Cultural Resource Management Plans will be developed for the Rattlesnake Hill archaeological district, the Alamo Mountain petroglyphs area, the Lone Butte area, sites on McGregor Range, and the Butterfield and Jornada del Muerto trails. The objective of the plans will be to protect the cultural resources in the respective areas within constraints set by the RMP/EIS. Site-specific actions will be determined when the plans are developed and EAs will be completed before any implementation.

Fire Management

The WSRA will continue to participate in the Joint Powers Agreement between the State of New Mexico and the United States Departments of Agriculture and the Interior. This agreement provides for mutual wildland fire assistance between the participating agencies. The WSRA is covered by the Lincoln Operating Unit established under this agreement.

The WSRA will continue to carry out the BLM's basic suppression policy of initial attack of all wildfires on or threatening public land with the objective being to contain the fire during the first burning period. This policy is implemented unless specific fire activity plans are prepared and approved in advance. Fires will be suppressed on all nonpublic lands in the WSRA initial attack zone.

BLM policy provides for limited fire suppression action in areas where the expense associated with the usual suppression procedures is not warranted. BLM determines the appropriate response to a wildland fire based upon suppression difficulty, the resource values threatened, and hazards to fire crews. Limited suppression plans are approved in advance defining the conditions in which a wildfire will be declared a limited suppression fire. Crew safety, along with economic factors, is normally the principal objective in designating an area for limited suppression.

The WSRA has a prescribed burning program. Prescribed burns are conducted as part of rangeland, wildlife, and watershed protection or improvement projects. These burns are analyzed on a project-by-project basis complying with the National Environmental Policy Act process.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

For practical and economic reasons, every conceivable management alternative has not been analyzed in this document. In developing the alternatives, the following proposals were brought up, discussed, and subsequently eliminated from detailed analysis for the reasons listed below.

Off-Road Vehicle (ORV) Designations

Public comments requested that the White Sands RMP consider the following ORV designations: limited ORV use on all public land in the Resource Area; limited ORV use along the shoreline of Elephant Butte Lake; camping limited to designated sites during hunting season; and limited ORV use on the west side of the Caballo Mountains.

Based on interdisciplinary discussions during the alternative formulation step of the planning process, these proposals were eliminated from detailed study for the following reasons:

1. ORV use and camping are legitimate uses of the public land.

2. ORV use and unrestricted camping does not appear to be causing extensive resource damage or creating conflicts with other users of the public land throughout the Resource Area.

3. Resource conditions do not warrant blanket ORV or camping limitations throughout the Resource Area or within the Caballo Mountains.

4. The BLM does not administer the shoreline of Elephant Butte Lake.

The 1983 session of the New Mexico Legislature passed legislation which restricts ORV use on State and Federal lands during the hunting season. Since most ORV use occurs during the hunting season, implementation of this legislation should reduce existing and potential problems.

COMPARISON OF ALTERNATIVES

Table 2-3 summarizes the specific components of each alternative. Table 2-4 summarizes and compares the potential impacts of each alternative on the different resources affected. Chapter 4 more fully describes those potential impacts.

TABLE 2-3
SUMMARY OF ALTERNATIVES

Issue/Resource	Existing	Balanced Alternative I	Production Alternative II	Protection Alternative III	No Action Alternative IV	No Livestock Grazing[a] Alternative V
RANGELAND MANAGEMENT						
Livestock						
Forage (AUMs)						
Preference	147,916					
5-Year Average	135,261					
Short-Term		116,079	116,079	105,682	<135,261 [b]	
Long-Term		181,864	191,003	130,115	<135,261 [b]	
Rangeland Improvements[c]						none
Rangeland Developments						
Pipeline (miles)		56 3/4	65 1/4	64		
Fence (miles)		60	67 3/4	66		
Wells (number)		14	15	12		
Storage Tanks (number)		12	13	11		
Drinking Troughs (number)		37	38	35		
Earthen Stock Tanks (number)		9	9	9		
Catchments (number)		1	1	1		
Vegetation Treatments (acres)	none	62,720	149,093	none	none	none
Chemical		58,742	145,115			
Burning		2,381	2,381			
Seeding		1,597	1,597			
Grazing Systems	8 AMPs	I allotments	All allotments (except Section 15's)	no new	no new	none
Wildlife						
AUMs Allotted	3,458 [d]					
Mule Deer		30,234	14,281	30,234	14,281	30,234
Pronghorn		2,852	1,247	2,852	1,247	2,852
Watershed Treatments (acres)	maintenance	62,586	62,586	73,601	maintenance	73,601
Wild Burros (AUMs)	144	144	-0-	600	144	600
SPECIAL MANAGEMENT AREAS						
Watershed Treatment Areas (acres)		Limit ORV (62,586)		Limit ORV (73,601)		
Percha Creek Riparian Area (acres)		Fence and limit ORV (320)		Fence, close to ORV, and designate NSO (320)		
Study Plot Exclosures (number)(acres)		42--Fence and close to ORV (1,680)	3--Fence (120)	92--Fence, close to ORV, and designate NSO (3,680)		

TABLE 2-3 (continued)
SUMMARY OF ALTERNATIVES

Issue/Resource	Existing	Balanced Alternative I	Production Alternative II	Protection Alternative III	No Action Alternative IV	No Livestock Grazing[a] Alternative V
SPECIAL MANAGEMENT AREAS (continued)						
Lake Holloman (acres)		Eliminate livestock grazing (1,160)		Eliminate livestock grazing (2,520) and fence (1,360)		
Three Rivers Petroglyph Site and Picnic Area (acres)	Under C&MU Act[e], 220 acres fenced[e], and limited ORV (interim)	Limit ORV (960)		Limit ORV (960) and fence (740)	Limit ORV (960) (interim)	
Rattlesnake Hill (acres)	NSO [e] and limited ORV (interim)	Close to ORV (640)		Close to ORV and close to improvements (640)	Limit ORV (640) (interim)	
Sacramento Escarpment (acres)	NSO (3,160)[e]	Designate ACEC, limit ORV, and designate additional NSO (3,640)		Designate ACEC, close to ORV, withdraw from mineral entry, and designate additional NSO (4,300)		
Alamo Mountain (acres)	No drilling or storage facilities near cultural sites[e]	Designate NSO and close to ORV (200)		Designate NSO, close to ORV, and close to improvements (340)		
Lone Butte (acres)		Limit ORV (100)		Limit ORV (320)		
Jarilla Mountains (acres)		Close to ORV (120)		Close to ORV (320)		
Butterfield Trail and Jornada del Muerto Trail (acres)		Limit surface disturbance (2,220) (1,252)		Limit surface disturbance (2,220) (1,252)		
McGregor Range (acres)	Limited ORV (116,000) (interim)			Limit ORV (116,000)	Limit ORV (116,000) (interim)	
Cornudas Mountains (acres)		Limit ORV (15,490)		Limit ORV (15,490)		
Brokeoff Mountains (acres)	Wilderness Interim Management (31,386)[e]			Limit ORV (7,779)		
Cuchillo Mountains (acres)				Limit ORV (6,160)		
ORV Use (acres)						
Open	-0-	1,668,529	1,754,265	1,524,355	-0-	
Limited	117,600	83,096	-0-	220,310	117,600	
Closed	-0-	2,640	-0-	9,600	-0-	
Undesignated	1,636,655	-0-	-0-	-0-	1,636,665	

TABLE 2-3 (concluded)
SUMMARY OF ALTERNATIVES

Issue/Resource	Existing	Balanced Alternative I	Production Alternative II	Protection Alternative III	No Action Alternative IV	No Livestock Grazing[a] Alternative V
LAND TENURE ADJUSTMENT (acres)	100 annually	45,000	58,000	177,000	100 annually	
Isolated and Difficult to Manage	x	x	x		x	
Lands Needed for Community Expansion	x	x	x	x	x	
Potential Exchange Lands	x			x	x	
Potential Acquisition Lands				x	x	
Land Where Interest Has Been Shown	x	x	x	x	x	
ACCESS						
Roads (miles)	-0-	238	422	135	-0-	
Easements (miles)	as needed	36	66	30	as needed	

Source: BLM Las Cruces District Office Files, 1984.

Notes: a/The No Livestock Grazing Alternative does not apply to the Special Management Areas, Land Tenure Adjustment, or Access issues.
b/An unknown amount of AUMs less than the 5-year average.
c/Under the No Action Alternative, only Range Betterment Funds will be used.
d/Existing AUMs allotted as shown in BLM case files. For analytical purposes, New Mexico Department of Game and Fish numbers were used.
e/Common to all alternatives.
x -- Indicates which proposals are being considered under each alternative.

TABLE 2-4
SUMMARY OF IMPACTS

	Existing	Balanced Alternative I		Production Alternative II		Protection Alternative III		No Action Alternative IV		No Livestock Grazing Alternative V	
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term
LANDS											
BLM Ownership	NS	NS	-2.5%	NS	-3.25%	NS	-8.5% +1.25%[a]	NS	NS	NS	NS
ACCESS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GEOLOGY AND MINERALS											
Mineral Exploration and Development	NC	-	-	NS	NS	-	-	NS	NS	NS	NS
SOILS											
Sediment Yield	NC	NS	+	NS	+	NS	+	NS	NS	NS	+
WATER RESOURCES											
Runoff	NC	NS	-15%	NS	-17%	NS	-14%	NS	NC	NS	-18%
Quality											
Surface	stable	NS	+	-	+	+	+	NS	NS	+	+
Subsurface	stable	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Depletion (acre-feet/year)											
Livestock, Wildlife, and Evaporation	380	388	450	359	462	327	390	NC	NC	215	216
VEGETATION											
Ecological Condition (acres)											
Excellent	0	0	17,900	0	28,707	0	8,950	0	0	0	0
Good	138,216	138,216	227,063	138,216	295,227	138,216	337,781	138,216	69,746	138,216	448,499
Fair	386,596	386,596	470,653	386,596	481,643	386,596	403,876	386,596	433,242	386,596	337,099
Poor	413,005	413,005	222,201	413,005	132,240	413,005	187,210	413,005	434,829	413,005	152,219
Forage Value Condition (acres)											
Good	422,239	422,239	535,922	422,239	565,406	422,239	572,546	422,239	328,414	422,239	609,214
Fair	252,401	252,401	215,180	252,401	272,138	252,401	200,528	252,401	335,345	252,401	185,831
Poor	263,177	263,177	186,715	263,177	100,273	263,177	164,743	263,177	274,058	263,177	142,772
Ground Cover	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Threatened or Endangered Plant Species	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
LIVESTOCK GRAZING											
Stocking Levels (AUMs)	147,916[b]	116,079[c]	181,864	116,079[c]	191,003	105,682[c]	130,115	147,916[b]	147,916	0[d]	0
WILD BURROS (number)	12	12	12	0	0	12	50	12	12	12	50

TABLE 2-4 (continued)
SUMMARY OF IMPACTS

	Existing	Balanced Alternative I		Production Alternative II		Protection Alternative III		No Action Alternative IV		No Livestock Grazing Alternative V	
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term
WILDLIFE											
AUMs Allotted[e/]	3,458[f/]										
Mule Deer (AUMs)		14,281(NC)	30,234(-)	14,281(NC)	14,281(-)	14,281(+)	30,234(-)	14,281(-)	14,281(-)	14,281(+)	30,234(+)
Pronghorn (AUMs)		1,247(NC)	2,852(-)	1,247(NC)	1,247(-)	1,247(+)	2,852(-)	2,852(-)	2,852(-)	2,852(+)	2,852(+)
Production of Preferred and Intermediate Browse Species (pounds per acre)	5.2	5.2	5.9	5.2	6.4	5.2	6.4	5.2	4.8	5.2	6.9
Change in Ecological Condition of Standard Habitat Sites[g/]	N/A	MC	+21-1%	MC	+28-3%	MC	+46-1%	MC	-7-0%	MC	+63-21%
Threatened or Endangered Fauna Species	NC	+	+	-	-	+	+	-	-	+	+
Riparian Areas	NC	+	+	+	+	+	+	-	-	+	+
RECREATION											
Recreation Opportunities	stable	+/-	+/-	-	-	+	+	NS	NS	+	+
Recreational Use	stable	+	+	+	+	NS	NS	NS	NS	NS	NS
VISUAL RESOURCES	stable	+/-	+/-	-	-	-	-	NS	NS	+	+
WILDERNESS	stable	-	-	NS	NS	NS	NS	NS	NS	+	+
CULTURAL RESOURCES											
Disturbance Due To:											
Trampling	SI	NC	I	NC	I	D	SD	NC	NC	D	D
Erosion	NC	NC	D	NC	D	D	D	NC	NC	SD	D
ORVs	NC	SI	SD	NC	NC	D	D	NC	NC	NC	NC
ECONOMIC CONDITIONS (dollars)											
Total Receipts	3,420,807	3,078,905	4,374,735	3,078,905	4,487,896	2,911,151	3,303,978	3,420,807	3,420,807	1,140,011	1,104,011
Change	NC	-341,902	953,928	-341,902	1,067,089	-509,656	-116,829	NC	NC	-2,316,796	-2,316,796
Variable Costs	1,712,575	1,435,178	1,932,833	1,435,178	1,988,158	1,351,322	1,542,176	1,712,575	1,712,575	521,090	521,090
Change	NC	-277,397	220,258	-277,397	275,583	-361,253	-170,399	NC	NC	-1,191,485	-1,191,485
AUM Costs	357,150	325,235	451,518	325,235	463,275	307,025	349,200	357,150	357,150	119,817	119,817
Change	NC	-31,915	14,368	-31,915	106,125	-50,125	-7,950	NC	NC	-237,333	-237,333
Returns Above Variable Costs	1,351,082	1,318,492	1,990,384	1,318,492	2,036,463	1,252,804	1,412,602	1,351,082	1,351,082	463,104	463,104
Change	NC	-32,590	639,302	-32,590	685,381	-98,278	61,520	NC	NC	-887,978	-887,978
Fixed Costs[h/]	245,980	245,980	245,980	245,980	245,980	245,980	245,980	245,980	245,980	245,980	245,980
Depreciation[h/]	618,574	618,574	618,574	618,574	618,574	618,574	618,574	618,574	618,574	618,574	618,574
Returns to Operator Labor, Management, and Capital	486,528	453,938	1,125,830	453,938	1,171,909	388,250	548,048	486,528	486,528	-401,450	-401,450
Change	NC	-32,590	639,302	-32,590	685,381	-98,278	61,520	NC	NC	-887,978	-887,978

TABLE 2-4 (concluded)
SUMMARY OF IMPACTS

	Existing	Balanced Alternative I		Production Alternative II		Protection Alternative III		No Action Alternative IV		No Livestock Grazing Alternative V	
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term
ECONOMIC CONDITIONS (dollars) (continued)											
Hired Ranch Labor (jobs)	29	27	45	27	46	26	29	29	29	9	9
Change	0	-2	16	-2	17	-3	0	0	0	-20	-20
Ranch Labor, Wages, and Salaries (dollars)	203,763	191,044	315,350	191,044	321,006	183,089	203,984	203,763	203,763	66,118	66,118
Change	0	-12,719	111,587	-12,719	117,243	-20,674	221	0	0	-137,645	-137,645
Estimated Fair Market Value (Lands) (dollars)	N/A	NC	4,500,000	NC	5,800,000	NC	15,400,000	NC	10,000	N/A	N/A
Estimated Assessed Valuation (Lands)	N/A	NC	1,499,850	NC	1,933,333	NC	5,132,820	NC	3,333	N/A	N/A
Estimated Potential Tax Revenue (Lands)	N/A	NC	24,031	NC	30,971	NC	82,238	NC	53	N/A	N/A
Construction and Maintenance (Access)											
Roads (miles)	N/A	NC	238	NC	422	NC	135	NC	NC	N/A	N/A
Cost (dollars)	N/A	NC	6,207,000	NC	8,600,000	NC	3,900,000	NC	NC	N/A	N/A

Source: BLM Las Cruces District Office Files, 1984.

Notes:
a/Reflects land acquisition by the BLM.
b/This figure is preference. Actual stocking would be closer to the 5-year average of 135,261 AUMs.
c/Estimated worst-case allocation. The monitoring studies would be used to determine actual levels of livestock use.
d/All AUMs would be available for big game.
e/AUM numbers followed by a (-) means that the vegetation inventory data indicate browse production may be insufficient while a (+) means that browse production would be more than sufficient for the big game numbers indicated.
f/Existing AUMs allotted as shown in BLM case files.
g/Indicates a range of change to the next higher ecological condition class. Under the Balanced Alternative, 21 percent of an unspecified SHS would change on the high end while only 1 percent of another SHS would improve on the low end.
h/Fixed costs and depreciation costs are assumed to remain constant.
I -- Increase.
D -- Decrease.
MC -- Minor Change.
N/A -- Not Applicable.
NC -- No Change.
NS -- Not Significant.
SD -- Slight Decrease.
SI -- Slight Increase.
+ -- Beneficial impact.
- -- Negative impact unless otherwise noted.

CHAPTER 3

AFFECTED ENVIRONMENT

CHAPTER 3
AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the environmental components of the White Sands Resource Area (WSRA) that would be impacted by implementing the alternatives. The components that could be affected include: physical setting, lands, access, geology and minerals, soils, water resources, vegetation, livestock grazing, wild burros, wildlife, recreation, visual resources, wilderness, cultural resources, and social and economic conditions.

Much of the information contained in this Chapter is extracted from the Management Situation Analysis (MSA) which is available for review in the WSRA Office.

PHYSICAL SETTING

Climate

The WSRA has an arid to semiarid continental climate with mild winters and hot summers. Average annual precipitation ranges from 8 to 10 inches at elevations below 6,000 feet and from 14 to 16 inches at higher elevations. Over half the yearly precipitation is received during July, August, and September when moist air masses move into the area from the Gulf of Mexico. Fall, winter, and spring are relatively dry seasons.

The average annual temperature of the WSRA is about 60°F. Maximum temperatures average about 95°F in the summer and minimum temperatures average about 25°F in the winter.

Wind speeds average about 6 miles per hour in the Resource Area. The spring months (March-May) are the windy season. Dry, gusty winds are predominantly from the west and may exceed 30 mph. The gusty winds, coupled with dry soils, occasionally cause severe afternoon dust storms.

Topography

The WSRA is within the Basin and Range physiographic province. Typical landforms include rugged and steep fault-block mountain ranges, broad basins, and gentle volcanic landforms. The prominent topographic features of the WSRA are: Brokeoff and Guadalupe Mountains, Crow Flats, foothills of the Sacramento Mountains, Otero Mesa, Tularosa Basin, Hueco

Bolson, Jarilla Mountains, Godfrey Hills, Caballo and Turtleback Mountains, foothills of the Black Range and Mimbres Mountains, Rio Grande Valley, and Jornada del Muerto Basin.

Elevations in the WSRA range from about 3,650 feet in the valley areas of Crow Flats to 8,000 feet at Rose Peak. Average elevation in the Resource Area is about 5,000 feet.

LANDS

The WSRA contains about 7 million acres of which approximately 1.8 million acres are public land administered by the Bureau of Land Management (BLM). Private land accounts for about .9 million acres. In addition, about 2 million acres of public land have been withdrawn for use by the White Sands Missile Range, Fort Bliss, the Bureau of Reclamation, the Federal Aviation Administration, and others. (See Table 3-1.) With the exception of the White Sands Missile Range in Otero County, the BLM is involved in the administration of some of the uses of these withdrawn lands. On most of the public land, the primary use is livestock grazing. Other land uses include mining, mineral material excavation, rights-of-way, leasing, and dispersed recreation.

TABLE 3-1
WSRA LAND STATUS IN ACRES[a/]

Landholders/Managers	Otero County	Sierra County	Total
BLM Land	929,578	824,687	1,754,265
Withdrawn Land[b/]	1,459,752	538,036	1,997,788
Other Federal Lands	497,296	467,587	964,883
Indian Land	460,255	-0-	460,255
State Land	449,908	361,195	811,103
Private Land	451,531	508,655	960,186
Total Federal[c/]	2,886,626	1,830,310	4,716,936
Total Acreage[d/]	4,248,320	2,700,160	6,948,480

Sources: Statistical Abstracts, 1979-80.
The Bureau of Land Management Factbook, 1982.
Master Title Plats.

Notes: a/Inland water areas are included in ownerships.
b/Includes that portion of McGregor Range cooperatively managed by BLM and U.S. Army; approximately 515,000 acres.
c/Includes BLM, withdrawn, and other Federal lands not listed (such as Forest Service and National Park Service).
d/Includes total Federal, Indian, State, and private lands.

The 960-acre Three Rivers Petroglyph Site, north of Tularosa, is the Resource Area's only parcel protected under the Classification and Multiple Use Act. The classification has been retained because the site has high recreational and historical values and it is necessary to protect the Federal Government's existing and future recreational improvements.

Current demand for uses of public land includes rights-of-way, leases, permits, and other public purposes. It is anticipated that future needs will include land sales of isolated and difficult to manage tracts and exchanges. Currently, about 570 acres of public land in Sierra County have been identified for this purpose. Further information on these lands is available in the WSRA Office. Disposal of land for community expansion is not expected to increase in the Resource Area in the near future. There has been some interest expressed by the State for exchanges of land that would consolidate State and Federal land ownership.

ACCESS

With one exception, legal access in the WSRA consists solely of County and State roads and U.S. Highways. The only access road in the WSRA for which the BLM has maintenance responsibility and control is the road to the radio communications site on Caballo Mountain in Sierra County. There are several thousand acres of public land in the WSRA which do not have legal access and are generally located where large amounts of private and State lands are intermingled with public land. BLM is currently allowed to use existing non-Federal roads, but this permission could be rescinded at any time. Because of this lack of guaranteed access and the potential problems involved in being locked out of the public land, acquisition of easements across non-Federal roads is desired. Some of the areas which have received some public concern in the past include the Cuchillo Mountains, the Animas Hills, and the Pinon area. Entry to the areas that do not have legal access could be denied by the private landowners at any time. Transportation plans, which portray the roads needed for access, are completed on a county-by-county basis; Sierra County is scheduled for fiscal year 1985 and Otero County has yet to be scheduled.

GEOLOGY AND MINERALS

As is common in the Basin and Range physiographic province, the WSRA is characterized by north-south elongate fault-block mountain ranges separated by grabens (down-dropped blocks) containing great thicknesses of alluvial material. The mountain ranges typically consist of Paleozoic and Mesozoic sediments, sometimes intruded by silicic igneous rocks. Tertiary volcanic activity was prominent in the western part of Sierra County as evidenced by the acid and intermediate range volcanic rocks exposed in the Sierra Cuchillo-Animas Hills area. Metamorphic rocks, although less common in the Resource Area, are present in the Jarilla Mountains of Otero County and the Caballo Mountains of Sierra County, and to lesser degrees in other areas.

Past and Present Producing Areas

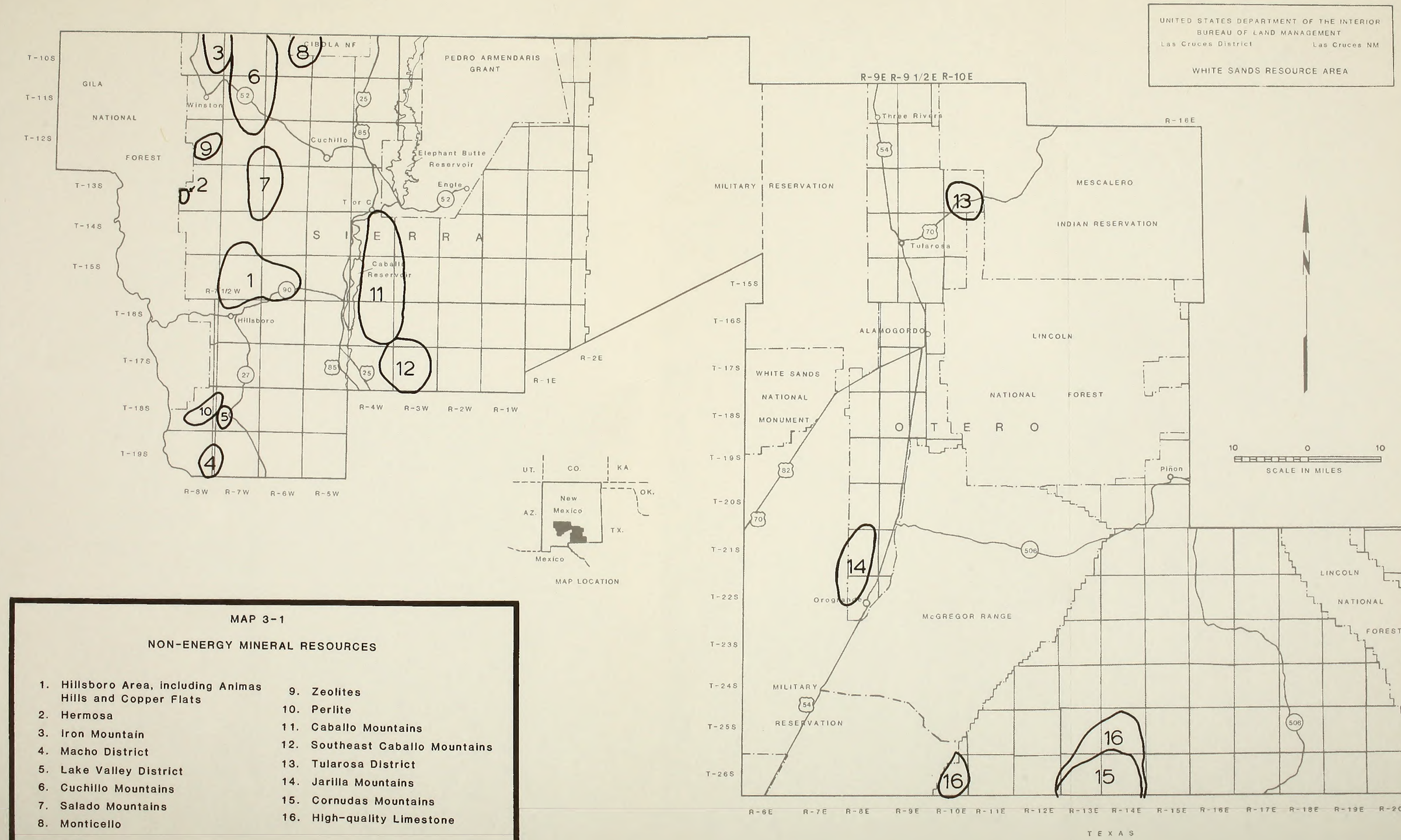
Locatable Mineral Resources

The locatable mineral resources of the area are diverse and include gold, silver, copper, lead, zinc, iron, molybdenum, cement-quality limestone, gypsite, turquoise, beryllium and other rare earths, tin, uranium, alunite, zeolites, fluorite, and manganese. Public land explored or developed for these commodities in the past is listed in Table 3-2. Most of these areas are also shown on Map 3-1.

TABLE 3-2
LOCATABLE MINERAL RESOURCES OF THE WHITE SANDS RESOURCE AREA

Location	Mineral Commodities
Sierra County	
Hillsboro Area (Animas Mountains, Copper Flats)	Gold, Silver, Copper, Molybdenum, Lead, Manganese
Black Range (Hermosa, Chloride)	Silver, Copper, Lead, Zinc
Cuchillo Mountains	Copper, Gold, Silver, Lead, Zinc, Tungsten, Iron, Fluorite, Beryllium, Manganese
Iron Mountain	Iron, Tungsten, Beryllium, Fluorite, Molybdenum
Salado Mountains	Fluorite
Lake Valley	Silver, Molybdenum, Gold, Manganese, Lead
Caballo Mountains	Gold, Iron, Silver, Cement-Grade Limestone, Uranium
Macho Mining District	Gold, Silver, Lead, Molybdenum, Vanadium
Monticello Area	Tin, Manganese, Alunite
Jornada del Muerto	Gypsite
Signal Peak Area	Uranium, Precious Metals (?)
Otero County	
Jarilla Mountains	Gold, Iron, Silver, Copper, Turquoise
Sacramento Mountains (Tularosa Mining District)	Copper, Molybdenum, Barite
Cornudas Mountain Area	Beryllium, Other Rare Earth Minerals
Otero Mesa near Hueco Mountains	Cement-Grade Limestone, Gypsum
White Sands Ranch	Gypsite

Sources: Harley, 1934; Jahns, 1944; Rothrock et al., 1946; Kelley and Silver, 1952; Anderson, 1957; Warner et al., 1959; Weber and Kottlowski, 1959; Northrup, 1959; Farnham, 1961; Kottlowski, 1962; Harrer and Kelley, 1963; U.S. Geological Survey, 1965; Schilling, 1965; Meeves, 1966; Williams, 1966; and Howard, 1967.



MAP 3-1

NON-ENERGY MINERAL RESOURCES

1. Hillsboro Area, including Animas Hills and Copper Flats
2. Hermosa
3. Iron Mountain
4. Macho District
5. Lake Valley District
6. Cuchillo Mountains
7. Salado Mountains
8. Monticello
9. Zeolites
10. Perlite
11. Caballo Mountains
12. Southeast Caballo Mountains
13. Tularosa District
14. Jarilla Mountains
15. Cornudas Mountains
16. High-quality Limestone

SOURCE: U.S. GEOLOGICAL SURVEY, 1983.

MAP 3-1 Non-energy Mineral Resources

Present production of locatable minerals from public land within the Resource Area is sporadic, although exploration activity abounds. The Copper Flats Project, a copper porphyry deposit with associated gold and molybdenum near Hillsboro, went into production early in 1982. Anticipated production was 15,000 tons per day, but the mine was forced to close shortly after opening due to poor market prices. It is now held by lienholders, but could become a producing mine again if market conditions improve.

Exploration for locatable minerals has been particularly active in the Jarilla Mountains, the Macho mining district, the Animas Mountains, the Caballo Mountains, the Signal Peak and Hermosa areas of the Black Range, and the Iron Mountain area.

Leasable Mineral Resources

There has been no production of hydrocarbons or geothermal energy in the Resource Area. Exploration for hydrocarbons peaked in 1982; major areas of interest included the Rio Grande Basin near Truth or Consequences, the Jornada del Muerto, the Alamogordo Strip along the eastern edge of the Tularosa Basin, and the Salt Basin area of southern Otero County. Thermal springs are present in the Truth or Consequences and Hillsboro areas; the only exploration on public land has been near Hillsboro (BLM files 1980-1984).

Minor amounts of sub-bituminous coal have been extracted from the Engle coal field east of the Caballo Mountains. A preliminary survey of this field was made by Kennecott several years ago. A larger and more promising coal deposit, the Sierra Blanca coal field, extends southward from Carrizozo in Lincoln County to the Three Rivers area of Otero County. Although coal production from this deposit has occurred in Lincoln County, none is known to have taken place in Otero County (Bodine 1956; Kottlowski 1964; Arnold and Hill 1980).

Sodium is reported to occur in lacustrine deposits of southeastern Otero County (U.S. Geological Survey 1973).

Saleable Mineral Resources

Sand and gravel are the most common saleable mineral materials in the WSRA and are generally found along mountain pediments, particularly the western edge of the Sacramento Escarpment, and in arroyos adjacent to mountain uplifts. Eolian sand is found within the Tularosa and Jornada del Muerto Basins. Cinders, fill material, building stone, and clay occur in minor amounts throughout the Resource Area.

Sales of mineral materials are made, when possible, from designated community pits. Existing community pits are: Community Pit No. 4 northeast of Tularosa (T. 14 S., R. 10 E., Section 6, Lot 1) and Community Pit No. 7, about 25 miles south of Alamogordo (T. 20 S., R. 9 E., parts of Section 9 and Section 10). Applications for material from other locations are common, particularly in the Alamogordo area. State, Federal, and local government agencies also obtain material from various locations throughout the Resource Area.

Potential Producing Areas

Locatable Mineral Resources

The potential for locatable mineral resources is moderate to high in many areas throughout the Resource Area. Foremost among these areas are the Animas Hills and Copper Flats area, Hermosa, Iron Mountain, the Macho mining district, Lake Valley, the Cuchillo Mountains, the Caballo Mountains, the Jarilla Mountains, and the Cornudas Mountains. Precious and base metals would be the major target in most of these areas, with three notable exceptions. These are Iron Mountain (iron, tungsten, beryllium), the Cornudas Mountains (beryllium and associated rare earth minerals), and the southeastern Caballo Mountains (cement-grade limestone). Southwest Portland Cement has been actively pursuing exploration in the southeastern Caballo Mountains for several years in the hopes of delineating a large deposit of low-magnesium limestone suitable for the development of a cement plant nearby. If the deposits are of sufficient quality and quantity and the market conditions are right, this plant could become a reality in the near future.

Other areas with some potential for the development of locatable mineral resources include the Juan Peak area near Monticello (alunite), the Salado Mountains (fluorite), several volcanic areas in western Sierra County (zeolites and perlite), and the Otero Mesa area near the Hueco Mountains (high-calcium limestone). See Map 3-1 for locations of these areas.

Leasable Mineral Resources

Although there has been little past production of leasable mineral resources in Otero and Sierra Counties, the potential for discovery of these resources is moderate to high in several areas. Lands with the greatest potential for hydrocarbon discoveries are in the Tularosa Basin; the major portion of which is presently withdrawn from mineral entry for military purposes. Areas of less potential for hydrocarbons include the Rio Grande Basin of Sierra County, the Jornada del Muerto, and the Crow Flats-western Brokeoff Mountains area. The presence of thermal springs near Truth or Consequences and Hillsboro and evidence of high heat-flow along the Rio Grande rift zone are favorable indicators for the presence of geothermal energy in this area of Sierra County. Large quantities of bituminous to sub-bituminous coal occur in the Sierra Blanca coal field within the Mesaverde formation; portions of this field extend into Otero County. Somewhat less favorable for development are the sub-bituminous coal deposits of the Engle coal field in Sierra County. See Map 3-2 for locations of these areas.

Saleable Mineral Resources

The need for the establishment of a new community pit near Alamogordo has been identified. An expanding population coupled with major road work has greatly increased the demand for sand and gravel resources. Saleable resources exist in other areas throughout the WSRA; however, except for site-specific construction projects, it is not probable that these resources will be needed in the near future.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Las Cruces District — Las Cruces NM

WHITE SANDS RESOURCE AREA

GILA NATIONAL FOREST
CIBOLA NF
PEORO ARMENOARIS GRANT
Winston
Cuchillo
Elephant Butte Reservoir
Engle
Caballo Reservoir
Hillsboro
MILITARY RESERVATION
WHITE SANDS NATIONAL MONUMENT
ALAMOGORDO
Tularosa
MESCALERO INDIAN RESERVATION
LINCOLN NATIONAL FOREST
O T E R O
Piñon
Orogrande
McGREGOR RANGE
MILITARY RESERVATION
TEXAS
SCALE IN MILES

MAP LOCATION

MAP 3-2
ENERGY MINERAL RESOURCES

- Geothermal Potential
- Highest Oil and Gas Potential
- Oil and Gas Potential
- Coal Field

1. Rio Grande rift zone
2. Tularosa Basin
3. Otero Mesa
4. Jornada del Muerto
5. Rio Grande Basin
6. Sierra Blanca
7. Engle

SOURCE: U.S. GEOLOGICAL SURVEY, 1983.

MAP 3-2 Energy Mineral Resources

SOILS

General Description

Soil surveys conducted by the Soil Conservation Service inventoried soil types and gathered interpretive data about the soils within the WSRA. These data were compiled in soil surveys of Otero County (June 1981) and Sierra County (June 1984).

Three Major Land Resource Areas (MLRAs) occur in the WSRA (Soil Conservation Service 1980). The MLRAs are a classification index to separate geographic areas on the basis of topography, geology, and climate, including temperature and moisture regimes, both of which have a major influence on soil development. Most of the WSRA occurs at lower elevations in the Southern Desert (SD-2 and SD-3) MLRA, with soils forming in the aridic (dry) moisture regime and thermic (warm) temperature regime. Areas at higher elevations near the Lincoln National Forest in Otero County and the Gila and Cibola National Forests in Sierra County are in the Canadian-Pecos Plains (CP-4) and Western Plateau (WP-3) MLRAs, respectively. Soils in these MLRAs formed in areas receiving higher annual precipitation and with lower mean annual temperatures.

Soils with similar characteristics, erosion class ratings, and potential for producing distinctive native plant communities make up range sites. Range sites commonly are named after dominant soil characteristics (e.g., sandy range site, gravelly range site, shallow loamy range site, etc.). For further discussion on range sites, see Chapter 3, Vegetation, and the Grazing Environmental Impact Statement (EIS) Southern Rio Grande Planning Area (BLM 1981). A map showing range sites for Otero County is available for review at the WSRA Office.

Soil Erosion

Two studies addressing sediment yield were conducted within the WSRA. These studies identified areas of high sediment yield. They were located on the sparsely vegetated breaks of the Rio Grande Valley and east of the Caballo Mountains in Sierra County (Earth Environmental Consultants, Inc. 1979). They were also identified in Otero County in the Crow Flats area and east of Tularosa and Three Rivers, New Mexico, where valley slopes have been dissected by gullies (Techrad 1980). Similar results were obtained in studies conducted by the BLM, Las Cruces District, as part of the 1977-1979 and 1981-1983 range inventories. Using the Pacific Southwest Interagency Committee method (see Appendix J), some of the highest producers of sediment in the WSRA were areas mapped as badlands (northeast of Tularosa), gravelly range sites (at the base of mountain ranges), and gravelly sand range sites (along river breaks in Sierra County).

Several areas have been identified as having active wind and water erosion. Most of the active wind erosion occurs in mesquite dune areas south of Alamogordo in Otero County and east of Engle in Sierra County. Soils are sandy textured with dunes formed around woody shrubs. West prevailing winds during the spring months cause active soil blowing on these areas.

Active gully erosion occurs at numerous areas throughout the WSRA. Upland valleys surrounded by limestone hills south of Pinon are commonly dissected by gullies and other narrow drainage ways. The gullies typically occur on deep, alluvial, calcareous, silt loam, and clay loam soils supporting a sod-bound blue grama vegetation type. Active gully erosion also occurs at lower elevations in southern Otero County and southeastern Sierra County in alluvial valleys and tobosa draws where soils are calcareous silt loams and silty clay loams. The soils forming in gypsiferous alluvium north of Alamogordo are also highly susceptible to gully erosion. These soils are mostly a silt loam texture with a high gypsum content, supporting primarily alkali sacaton in the lower swale position of the landscape.

WATER RESOURCES

Surface Water

Quantity

The WSRA includes parts of four major surface water drainage basins. Three of these basins (the Tularosa, Salt, and Jornada del Muerto Basins) are Central Closed Basins, and have no surface drainage outlets. These basins are usually dry, although runoff will accumulate in lowland areas for short durations during periods of high rainfall. The fourth basin, the Rio Grande, is a contributing basin dominated by the south draining Rio Grande, the major perennial water source in the Resource Area. A discussion of the Rio Grande Basin is contained in the Grazing EIS Southern Rio Grande Planning Area (BLM 1981).

Surface water is a scarce commodity within the Central Closed Basins. Perennial stream flows do exist in the Tularosa and Salt Basins, but are limited to those stream segments that drain the mountainous regions forming the eastern boundary of the Tularosa Basin and the northwestern boundary of the Salt Basin. The primary stream systems draining into the Tularosa Basin are: (a) Three Rivers, which drains the western side of Sierra Blanca and flows southwesterly into the Tularosa Basin; (b) the Tularosa River, which drains the Mescalero Indian Reservation upstream from the Town of Tularosa and which has the only permanent stream gaging system in the Central Closed Basins (average annual flow is 9.8 cubic feet per second); and (c) Fresnal Creek-La Luz Creek, a small spring system draining the western side of the Sacramento Mountains southeast of Tularosa. Stream systems with perennial flow draining into the Salt Basin are the Sacramento River, which has perennial flow in the Sacramento Mountains, but becomes intermittent prior to its termination on the Otero Mesa southwest of Pinon, and Pinon Creek, which drains the higher areas of the northern Salt Basin, terminating in the Crow Flats. No streams with perennial flow drain into the Jornada del Muerto Basin. (See Map 3-3 for the locations of these drainages.)

Runoff

That part of precipitation that manifests itself as flow in surface streams is known as runoff. The annual runoff is the total runoff

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Las Cruces District Las Cruces NM
WHITE SANDS RESOURCE AREA

GILA NATIONAL FOREST
CIBOLA NF
5-1
Alamosa Creek
Cuchillo Negro
Palomas Creek
Seco Creek
Animas Creek
Percha Creek
Trujillo Creek
Tierra Blanca Creek
Berrenda Creek
9-2
TorC
Elephant Butte Reservoir
Caballo Reservoir
SIERRA
5-1
PEDRO ARMENDARIS GRANT
4-2
MILITARY RESERVATION
Three Rivers
Tularosa River
Tularosa
MESCALERO INDIAN RESERVATION
Fresno-La Luz Creek
Alamogordo
LINCOLN NATIONAL FOREST
WHITE SANDS NATIONAL MONUMENT
4-3
OTERO
Piñon Creek
Sacramento River
McGREGOR RANGE
Orogrande
MILITARY RESERVATION
4-4
LINCOLN NATIONAL FOREST
Piñon Creek
TEXAS
N
10 0 10
SCALE IN MILES

UT. CO. KANS.
NEW MEXICO
OKLA.
AZ.
TX.
MEXICO
MAP LOCATION

MAP 3-3
SURFACE-WATER BASINS AND MAJOR DRAINAGES

RIO GRANDE BASIN

5-1 Rio Grande

CENTRAL CLOSED BASINS

4-2 Jornada del Muerto
4-3 Tularosa Basin
4-4 Salt Basin

SOUTHWESTERN CLOSED BASINS

9-2 Mimbres Basins

SOURCE: BLM Las Cruces District Files 1984.

MAP 3-3 Surface-Water Basins and Major Drainages

produced by the many rains during the year. The estimated mean annual runoff for the WSRA ranges from 1 inch in the mountains to 0.1 inch in the valleys. The variability of runoff from place-to-place and from year-to-year is primarily associated with corresponding variations in precipitation. Intense thundershowers from July through September generally contribute 50 percent of the annual rainfall, and most of the annual runoff occurs during this period.

The kind of soil and amount and type of vegetation have a major effect on the amount of precipitation that runs off. Studies performed by Techrad (1980) in the Salt Basin and Earth Environmental Consultants (1979) in the Rio Grande Basin indicate that, given similar soils and equal storm frequencies and duration, watersheds dominated by grass vegetation have lower estimated runoff rates than watersheds of equal size dominated by creosotebush vegetation. In the Salt Basin study, runoff for watersheds with pinyon-juniper type vegetation was intermediate between that for grass-dominated watersheds and creosotebush-dominated watersheds. This difference in runoff reflects different patterns of on-site utilization of water and is significant because runoff is the primary force in initiating erosion and transporting sediment.

Quality

The quality of surface water in the WSRA is moderately hard and alkaline with relatively low levels of sodium, chloride, and sulfate. Salinity, as measured by total dissolved solids (TDS), is also low except in the playa lakes, which are present seasonally in the Central Closed Basins. Waters in the Fresnal-La Luz Creek system have high levels of chloride, sulfate, and salinity exceeding the secondary maximum contaminant level (SMCL) for these parameters. (See Appendices B-2 and B-3.) Since the Fresnal-La Luz Creek system is not the primary source for domestic water supplies, domestic water quality standards are not exceeded. Data collected between 1975 and 1979 at the U.S. Geological Survey gaging station on the Tularosa River reveal sediment discharges generally between 1-4 tons per day, although one recording of 2,190 tons per day was made. This figure probably indicates construction activities or similar disturbances upstream. Additional information on surface water quality and quality standards are contained in the WSRA Management Situation Analysis available for review at the WSRA Office.

The primary use of water is by livestock and wildlife. Water quality samples collected from numerous stockwater impoundments and major streams in the Resource Area indicate that the water is below the recommended upper limit for livestock and wildlife, as established by the Environmental Protection Agency.

Ground Water

Quantity

Most of the ground water in the Tularosa and Salt Basins occurs in the alluvial deposits on the lower mountain slopes and the deep alluvial or

bolson deposits in the valleys. The bolson deposits are a heterogeneous mixture of rock debris from the surrounding uplands, generally of Quaternary age. Ground water is present in sand and gravel sequences which are frequently interbedded with clay and silt. Most of the ground water occurs under water-table conditions; however, due to the wide range in permeability of the bolson deposits, some ground water occurs under artesian conditions. The ground water is derived from precipitation, with most of the recharge occurring along permeable streambeds. Sedimentary rocks of Permian to Cretaceous age yield some ground water in the northern Tularosa Basin, and Permian limestones are important aquifers in the Salt Basin area. Recharge to these aquifers occurs primarily in the upland regions where these formations are exposed, and precipitation can seep into the rock through fractures and vugs. More comprehensive information can be found in individual basin reports available for review at the WSRA Office.

Quality

Ground water quality in the WSRA is highly variable depending upon the types of soluble minerals found in the water bearing strata of the individual basins. In general, the water of the Central Closed Basins tends to be hard (>300 milligrams per liter [mg/l] total hardness), high in sulfate concentrations (>250-500 mg/l), and high in salinity (TDS >500-1,000 mg/l). Water in the alluvial deposits of the Tularosa Basin is freshest near the mountain front and generally increases in salinity with distance westward and with depth. The only area of freshwater (TDS <1,000 mg/l) in the Tularosa Basin lies south of Alamogordo from the Alamo Canyon alluvial fan to about 10 miles south of Grapevine Canyon (T. 16 S.-T. 21 S., R. 9 E.-R. 10 E.). In the Tularosa and Salt Basins, the Tularosa-Three Rivers area has the poorest quality water (based on hardness, sulfate, and salinity levels), followed by the Orogrande-Alamogordo, Otero Mesa-Crow Flats, and Pinon areas (Techrad 1980).

Water Use

Within the Resource Area, the primary use of water on the public rangeland is by livestock and wildlife. Most of the water provided for this purpose is depleted in two ways: (a) water consumed by animals and (b) evaporation from facilities constructed to furnish water supplies.

The total water depleted annually in Otero County is estimated to be 380 acre-feet, consisting of 165 acre-feet consumed by livestock, 1 acre-foot consumed by wildlife, and 214 acre-feet evaporated from earthen stock tanks. No attempt was made to determine evaporation from storage tanks or drinking troughs. Over half of the water consumed by livestock and wildlife is estimated to come from ground water sources. The Grazing EIS Southern Rio Grande Planning Area (BLM 1981) contains information on water use in Sierra County.

Problem Areas

The major problems associated with water resources in the Resource Area are sediment and floodwater, and water quality of the Tularosa River.

Several areas are especially prone to flooding and sediment influx, including Alamogordo-La Luz Creek, Cornucopia Draw, Cornudas Draw, and Crow Flats. In addition, there is the potential for water contamination of the Tularosa River stemming from a closed landfill on Federal land east of the town of Tularosa.

VEGETATION

A soil-vegetation inventory was completed on 954,004 acres of public land in Otero County and parts of Eddy, Chaves, and Lincoln Counties in 1982-1983. Range sites were delineated based on soil characteristics and landform. Vegetation was identified on each range site.

Vegetation transects were run on all allotments within the grazing district boundary. Most of the allotments outside this boundary were not transected and these acres by range site are listed as unclassified in Table 3-3. Transect data consisted of vegetation production by plant species, percent composition, and ground cover. Ground cover included vegetation species, litter, bare ground, and large and small rocks.

Data gathered during this inventory provided pounds of vegetation produced during the 1982 growing season on various range sites. This inventory also provided information for determining ecological condition and forage value class ratings. The methodologies used in the range inventory are explained in Appendices C-4 to C-8. Vegetation subtypes are shown on Visual C. (See Map Pocket.) Vegetation types for Sierra County can be found in the Grazing EIS Southern Rio Grande Planning Area (BLM 1981). Major plant species identified on the vegetation transects in this part of the Resource Area are listed in Appendix C-9.

Otero County and small parts of Eddy, Chaves, and Lincoln Counties fall within two MLRAs as described by the U.S. Department of Agriculture (USDA), Soil Conservation Service (1982). The two MLRAs are Southern Desert, Subresource Areas SD-2 and SD-3 (MLRA 42) and Canadian-Pecos Plains, Subresource Area CP-4 (MLRA-70).

The Southern Desert MLRA (SD-2) is characterized by elevations of 3,800 feet to 5,200 feet. Gently sloping plains and rugged desert mountains rise abruptly from the floodplain. Climate in this warm arid region is characterized mostly by summer precipitation with an annual rainfall of 8 to 10 inches. Average annual temperature is 60°F with extremes of 5° below zero in the winter and 110°F in the summer. The average frost-free season ranges from 200 to 215 days. Potential natural vegetation on these soils is both grassland and mixed grass-shrubland vegetation. There is 18 percent or 175,549 public land acres in this MLRA.

The Southern Desert MLRA (SD-3), characterized by elevations of 2,840 feet to 5,000 feet, is associated with gently sloping plains and low limestone hills. Climate is warm and has an average annual precipitation of 8 to 13 inches. The average annual temperature is 61°F with extremes of 25° below zero to 112°F in the summer. The average frost-free season ranges from 207 to 220 days. Potential natural vegetation on these soils is mid-

TABLE 3-3
PUBLIC LAND ACRES AND PERCENTAGES FOR ECOLOGICAL CONDITION AND FORAGE VALUE CLASS BY RANGE SITE[a/]

Range Site	Ecological Condition								Forage Value Class					
	Good	Percent	Fair	Percent	Poor	Percent	Unclassified	Percent	Good	Percent	Fair	Percent	Poor	Percent
Southern Desert MLRA - 42														
Gravelly														
SD-2					8,847	1	3,334	0					8,847	1
SD-3	2,231	0	30,101	3	45,930	5			19,464	2	10,154	1	48,644	5
Deep Sand					49,338	5					8,082	1	41,256	4
Sandy														
SD-2			570	0	23,418	2	1,401	0	9,013	1			14,975	2
SD-3					7,027	1			591	0			6,436	1
Gyp Hills			1,562	0	12,991	1	496	0			12,018	1	2,535	0
Loamy														
SD-2					20,377	2	1,249	0	8,572	1	7,273	1	4,532	0
SD-3	19,282	2	41,421	4	79,446	8			42,006	5	14,979	2	83,164	9
Bottomland														
SD-2			820	0							105	0	715	0
SD-3					6,392	1					4,172	0	2,220	0
Limestone Hills														
SD-2			4,358	1	5,373	1	2,722	0	624	0	8,155	1	952	0
SD-3	79,213	8	100,201	10	2,974	0			133,087	14	46,327	5	2,974	0
Igneous Hills and Mountains	8,026	1	4,469	1	4,346	1			14,814	2			2,027	0
Salt Flats			1,830	0	6,268	1			5,688	1	2,410	0		
Shallow Sandy	4,097	1	106,462	11	970	0			109,628	12	1,901	0		
Gyp Upland			1,663	0	62,136	7	885	0	9,660	1	42,772	5	11,367	1
Draw					412	0					412	0		
Shallow	15,343	2	23,507	2	8,876	1			15,508	2	23,346	3	8,872	1
Limy			3,974	0	2,869	0			3,974	0	1,670	0	1,199	0
Pseudoriparian[b/]	45	0									45	0		
Badlands[b/]			8,202	1	5,507	1			2,202	0	2,290	0	9,217	1
Subtotal	128,237	14	329,140	33	353,497	38	10,087	0	374,831	41	186,111	20	249,932	25
Canadian-Pecos Plains MLRA - 70														
Limestone Hills	3,874	0	49,168	5	43,652	5	5,466	1	34,565	4	59,702	6	2,427	0
Shallow			83	0	1,155	0	120	0	83	0			1,155	0
Loamy	224	0	1,350	0	6,234	1	209	0	1,574	0	892	0	5,342	1
Swale			74	0	1,098	0			74	0	1,098	0		
Gravelly			802	0	6,003	1			2,484	0			4,321	0
Shallow Loamy	5,881	1	5,979	1	1,366	0	305	0	8,628	1	4,598	1		
Subtotal	9,979	1	57,456	6	59,508	7	6,100	1	47,408	5	66,290	7	13,245	1
TOTAL	138,216	15	386,596	39	413,005	45	16,187	1	422,239	46	252,401	27	263,177	26

Source: BLM Las Cruces District Inventory Data, 1982-1983.

Notes: a/Total acres for Otero and parts of Lincoln, Eddy, and Chaves Counties. There are no acres in excellent ecological condition.
b/Not a Soil Conservation Service range site; developed by BLM Las Cruces District for this document.

and short-grasses. The drier, shallow soil areas support shrub and half-shrub mixtures in combination with grasses. There is 68 percent or 645,412 public land acres in this MLRA.

The Canadian-Pecos Plains MLRA is characterized by elevations of 4,000 feet to 7,000 feet. Strongly sloping to moderately steep and hilly landforms of limestone with intermittent drainage ways traverse this area. Small areas of valley bottoms and floodplains are associated with the nearly level to gently sloping landscapes. Average annual precipitation is 13 to 18 inches received during the summer months. Average annual temperature is 55°F to 60°F with extremes of 20° below zero to 110°F in the summer. Average frost-free season ranges from 180 to 200 days. Potential natural vegetation on these limestone soils is scattered juniper-pinyon on the upper elevations and a diverse variety of understory vegetation. There is 14 percent or 133,043 public land acres in this MLRA.

An analysis of the inventory data dealing with range sites, associated vegetation subtypes, and ecological condition classes is presented in Appendix C-10. Averages are given for pounds of vegetation production per acre (1982 growing season). Percent composition by weight of grasses and shrubs is shown relative to the desirabilities of plant species preferred by livestock. The three categories are desirable, intermediate, and least desirable, based on palatability and preference.

Total pounds of vegetation production per acre during the 1982 growing season varied from 12 to 1,256 pounds in the Southern Desert MLRA. The Canadian-Pecos Plains MLRA varied from 80 to 2,496 pounds per acre. This variation existed on all vegetation subtypes within range sites. The high, low, and weighted average vegetation production for each range site is presented in Table 3-4.

The ecological condition class ratings are based on the Soil Conservation Service's potential plant community for a particular range site as compared to the existing species composition. The description of the potential plant communities on all range sites are available in Technical Guides from the USDA, Soil Conservation Service (1980).

Forage value class ratings are based entirely on the existing vegetation situation. The presence or absence of a certain species can make this rating higher, equal to, or lower than the ecological condition. The methodology for determining the forage value class rating is shown in Appendix C-5.

Apparent trend information was collected by site write-up area (SWA) for all allotments within the grazing district boundary in Otero County and parts of Lincoln, Eddy, and Chaves Counties. The apparent trend information is based on one growing season. Apparent trend information shows approximately 77 percent of the area is in static condition with 4 percent improving and 19 percent in a downward trend. The methodology used for determining apparent trend is shown in Appendix C-7. Trend studies on allotments with Allotment Management Plans (AMPs) have been conducted for approximately 10 years. The data from these studies show rainfall as the

TABLE 3-4
AVERAGE VEGETATION PRODUCTION BY RANGE SITE[a]

Range Site	Pounds of Production per Acre			SCS Potential Average Pounds of Production per Acre b/	
	High Average	Low Average	Weighted Average	Years	
				Favorable	Unfavorable
Southern Desert MLRA 42					
Gravelly					
SD-2	188	188	188	450	150
SD-3	254	119	180	1,000	300
Deep Sand	628	207	544	600	175
Sandy					
SD-2	556	68	325	650	225
SD-3	273	84	156	1,200	600
Gyp Hills	405	116	264	300	100
Loamy					
SD-2	662	163	346	675	300
SD-3	912	95	322	1,200	650
Bottomland					
SD-2	468	384	426	3,500	1,800
SD-3	1,256	143	885	5,000	2,500
Limestone Hills					
SD-2	384	160	253	750	325
SD-3	597	137	350	1,400	600
Igneous Hills and Mountains	535	176	388	750	325
Salt Flats	492	12	160	1,100	400
Shallow Sandy	890	187	620	1,050	600
Gyp Upland	912	142	325	600	200
Draw	423	423	423	3,500	1,200
Shallow	507	173	321	800	250
Limy	713	155	423	1,350	500
Riparian[c]	579	305	617	3,000	1,000
Pseudoriparian[c]	726	332	473	1,000	500
Badlands[c]	368	211	327	600	300
Canadian-Pecos Plains MLRA 70					
Limestone Hills	504	109	293	1,750	700
Shallow	243	99	171	1,100	450
Loamy	1,869	189	583	1,500	800
Swale	2,469	404	1,450	3,000	1,600
Gravelly	321	202	274	1,000	300
Shallow Loamy	1,338	80	531	1,600	500

Sources: BLM Las Cruces District Inventory Data, 1982.
USDA, Soil Conservation Service, 1980.

Notes: a/Information obtained from data in Appendix C-10 (Average Production and Plant Composition).
b/USDA, Soil Conservation Service potential average pounds of production per acre figures for favorable and unfavorable years are presented for comparison purposes only.
c/Not a Soil Conservation Service range site; developed by BLM Las Cruces District for this document.

overriding influence in these study areas and that upward and downward trends occur during periods of favorable and unfavorable climatic conditions.

Public land acres and percentages for each ecological condition and forage value class by range site are presented in Table 3-3. Information pertaining to individual grazing allotments (acres, land status, range sites, vegetation subtypes, and condition) is available for review in the WSRA Office.

Vegetation Subtypes and Range Site Descriptions

Soil-vegetation inventory data gathered during the 1982-1983 inventory show 13 vegetation subtypes covering 28 range sites in Otero County and parts of Lincoln, Eddy, and Chaves Counties. Four major vegetation subtypes comprise 877,313 acres or 92 percent of the same area. (See Table 3-5.) Four major range sites comprise 56 percent or 536,226 acres of the area. (See Table 3-6.)

TABLE 3-5
ACRES AND PERCENT OF PUBLIC LAND BY VEGETATION SUBTYPE

Vegetation Subtype	MLRA 42 (acres)	Percent	MLRA 70 (acres)	Percent
Short-grass	409	0	991	0
Mid-grass	249,121	26	73,032	8
Creosotebush	244,050	26	8,597	1
Tarbush	3,531	0	0	0
Mesquite	66,094	7	866	0
Fourwing Saltbush	21,639	2	0	0
Mixed Desert Shrub	226,556	24	8,997	1
Mixed Mountain Shrub	2,583	0	17,902	2
Yucca	884	0	0	0
Snakeweed	1,905	0	1,953	0
Other Shrubs	4,003	1	0	0
Pinyon-Juniper	186	0	19,727	2
Juniper	0	0	978	0
Subtotal	820,961	86	133,043	14
TOTAL ACRES[a/]	954,004			

Source: BLM Las Cruces District Inventory Data, 1982-1983.

Note: a/Includes Otero County and parts of Lincoln, Chaves, and Eddy Counties.

The Southern Desert MLRA includes 22 different range sites with 13 vegetation subtypes present. Three major range sites (shallow sandy,

TABLE 3-6
SUMMARY OF PUBLIC LAND ACRES AND PERCENT BY RANGE SITES AND MAJOR VEGETATION SUBTYPES[a/]

Range Site	Acres	%	Grass	%	Creosotebush	%	Mesquite	%	Mixed Mountain Shrub	%	Mixed Desert Shrub	%	Pinyon-Juniper	%	Other Important Subtypes	%	
Southern Desert MLRA - 42																	
Gravelly																	
SD-2	12,181	1			9,692	80					2,489	20					
SD-3	78,262	18	2,666	4	73,799	94					1,797	2					
Deep Sand	49,338	5			1,187	2	48,151	98									
Sandy																	
SD-2	25,389	3	570	2	7,454	29	7,521	30			1,401	6			8,443	33	Fourwing Saltbush
SD-3	7,027	1			684	10					5,459	78			884	12	Yucca
Gyp Hills	15,049	1			10,952	73			264	1	3,647	24	186	1			
Loamy																	
SD-2	21,626	2	10,759	50	3,764	17	5,889	27			1,214	6					
SD-3	140,149	15	46,280	33	56,449	40					30,825	22			3,531	3	Tarbush
															3,064	2	Fourwing Saltbush
Bottomland																	
SD-2	820	0	715	87							105	13					
SD-3	6,392	1	5,906	92	486	8											
Limestone Hills																	
SD-2	12,453	1			603	5					11,850	95					
SD-3	182,388	19	41,167	22	1,614	1					139,607	77					
Igneous Hills and Mountains	16,841	2	1,957	12	127	1			2,319	13	12,438	74					
Salt Flats	8,098	1	5,688	70							1,830	23			580	7	Fourwing Saltbush
Shallow Sandy	111,529	12	105,317	94	110	0					4,197	4			1,905	2	Snakeweed
Gyp Upland	64,684	7	23,623	37	22,694	35	4,050	6			4,765	7			9,552	15	Fourwing Saltbush
Draw	412	0	412	100													
Shallow	47,726	5	165	0	47,561	100											
Limy	6,843	1	4,305	63	962	14	483	7			1,093	16					
Pseudoriparianb/	45	0									45	100					
Badlands[b/]	13,709	1			5,912	43					7,797	57					
Subtotal	820,961	86															
Canadian-Pecos Plains MLRA - 70																	
Limestone Hills	102,160	11	70,315	69					8,112	8	2,382	2	19,398	19	1,953	2	Snakeweed
Shallow	1,358	0	1,155	85					83	6			120	9			
Loamy	8,017	1	1,158	15	4,276	53	866	11	408	5	967	12	342	4			
Swale	1,172	0	1,172	100													
Gravelly	6,805	1			4,321	63			802	12	1,682	25					
Shallow Loamy	13,531	1	223	2					8,497	63	3,966	29	845	6			
Subtotal	133,043	14															
TOTAL ACRES	954,004																

Source: BLM Las Cruces District Inventory Data, 1982-1983.

Notes: a/From data in Appendix C-11 (Public Land Acres and Percent by Vegetation Subtype and Range Site).
b/Not a Soil Conservation Service range site; developed by BLM Las Cruces District for this document.

loamy, and limestone hills) occur in this MLRA, totaling 434,066 acres. All four major vegetation subtypes (mid-grass, creosotebush, mesquite, and mixed desert shrub) are present.

The Canadian-Pecos Plains MLRA includes six different range sites with nine vegetation subtypes present. One major range site (limestone hills) occurs in this MLRA, totaling 102,160 acres. All four major vegetation subtypes are present.

Acres of public land and percent for each vegetation subtype are presented in Table 3-5. Acres for each range site with associated major vegetation subtypes and percentages are presented in Table 3-6. Appendix C-11 shows the acres of each vegetation subtype occurring on each range site. Range site descriptions are available in the Technical Guides from the USDA, Soil Conservation Service (1980).

Major Range Sites -- Southern Desert MLRA and Associated Vegetation Subtypes

Shallow sandy range sites cover 111,529 acres or 12 percent of the public land in Otero and parts of Lincoln, Eddy, and Chaves Counties. These sites occur on upland plains between desert drainage ways. Slopes are nearly level to undulating, usually less than 9 percent. The general aspect of this site is that of a grassland sparsely dotted with shrubs. Black grama is the dominant plant, both in aspect and composition. Mid-grasses occur on 105,317 acres or 94 percent of the shallow sandy range site. Elevations range from 2,842 feet to 4,500 feet.

Loamy range sites cover 140,149 acres or 15 percent of the public land in Otero and parts of Lincoln, Eddy, and Chaves Counties. These sites occur on plains, drained or protected floodplains, broad terraces, or fans between desert drainage ways. Slopes range from level to gently sloping, usually less than 5 percent. The potential plant community has a grassland aspect. It is dominated by drought tolerant short- and mid-grasses that occur on 46,280 acres or 33 percent of the area. Creosotebush occurs on 56,449 acres or 40 percent of this range site and mixed desert shrub occurs on 30,825 acres or 22 percent of this range site. Elevations range from 2,842 feet to 4,500 feet.

Limestone hills range sites cover 182,388 acres or 19 percent of the public land in Otero and parts of Lincoln, Eddy, and Chaves Counties. These sites occur as hills, low mountains, or the lower footslopes of higher mountains. Slopes are from rolling to very steep and vary from 15 to 50 percent, averaging about 25 percent. This plant community is dominated by mixed desert shrubs on 139,607 acres or 76 percent of this range site and mid-grass on 41,167 acres or 23 percent of this range site. Mid-grasses and shrubs are most prevalent on the north and east slopes while short-grasses and half-shrubs are dominant on the south and west slopes. Elevations range from 3,500 feet to 4,500 feet.

Percentages of vegetation production and ecological condition vary on each range site depending on other associated species.

Major Range Sites -- Canadian-Pecos Plains MLRA and Associated Vegetation Subtypes

Limestone hills range sites cover 102,160 acres or 11 percent of the public land in Otero and parts of Lincoln, Eddy, and Chaves Counties. These sites occur as hills, low mountains, and footslopes of higher mountains. Slopes range from 15 to 75 percent and average 20 percent. North slopes are cooler, have a better soil moisture relationship, and therefore produce more forage and a varied community. This is a plant community dominated by warm season mid-grasses on 70,315 acres or 69 percent of this range site. Pinyon-juniper occurs on 19,398 acres or 19 percent of this range site. The north slopes typically have more cool season species and pinyon-juniper than the south slopes. Elevations range from 4,000 feet to 7,000 feet.

Percentages of vegetation production and ecological condition vary for each range site depending on other associated species. Vegetation information for Sierra County is discussed in the Grazing EIS Southern Rio Grande Planning Area (BLM 1981).

Forage Species

The phenology of the more important forage species for livestock (grasses) and wildlife (shrubs) is contained in Technical Report III. These species occur predominantly in the Southern Desert MLRA which covers 86 percent or 820,961 acres of the public land in Otero and parts of Lincoln, Eddy, and Chaves Counties. The forage species are comprised primarily of warm-season perennial grasses and a few cool-season shrubs.

The Canadian-Pecos Plains MLRA covers 14 percent of the public land in the area with mid-grasses the dominant vegetation subtype on 8 percent or 72,032 acres. Annual grasses and forbs were not listed; however, they are recognized as being vitally important and contribute substantially to the diet of livestock and wildlife on semidesert rangelands.

Studies using esophageal fistulated animals show that cattle diets contain about 30 percent forbs on a yearly basis (Pieper and Beck 1980; Gonzalez-Rodriguez et al. 1978; Rosiere et al. 1975; Galt et al. 1969; Herbel and Nelson 1966). Rosiere et al. (1975) found that although perennial grasses represented a dependable source of forage, they never comprised more than 50 percent of a steer's diet in any season. Rangeland managers are aware of the importance of forbs in livestock diets and that perennial grasses are not be the sole criterion for estimating forage production or determining stocking rates.

Poisonous Plants

The average annual livestock death loss from poisonous plants is estimated at 2 to 5 percent, although the specific cause of death frequently is not determined. Besides death losses, there are losses from weight reduction, poor reproduction, and weakness. Appendix C-13 contains a list of poisonous plants. Additional information is contained in New Mexico

State University, Cooperative Extension Service Circular 400B-1, Poisonous Range Plants of New Mexico (Schickedanz 1981); Circular 400B-14, An Annotated Checklist of Poisonous or Injurious Range Plants of New Mexico (Allred 1982); and Circular 456, Managing Semideserts of the Southwest (Herbel and Gould 1980).

Poisonous plant information for Sierra County is discussed in the Grazing EIS Southern Rio Grande Planning Area (BLM 1981).

Threatened or Endangered Plant Species

A list of Federal endangered, proposed, candidate, and State sensitive plants which occur in the WSRA is presented in Appendix C-12.

LIVESTOCK GRAZING

There are 106 grazing allotments in Otero County. Grazing allotments for Sierra County are discussed in the Grazing EIS Southern Rio Grande Planning Area (BLM 1981). Grazing use is authorized by permit or license on 77 allotments inside the grazing district boundary and by leases on 29 allotments outside the grazing district. Eleven of these allotments lie partially outside of Otero County in the Roswell District, but grazing use is administered by the Las Cruces District, WSRA. An Inter-District Agreement between the Roswell District and Las Cruces District covering these allotments was approved on December 3, 1979. These grazing allotments include the Permian Exploration Corporation, Quatro Amigos, Manuel Tanner, J. P. Cauhape, Hughes Brothers, Harvey E. Yates Company, Kennedy Oil, W. A. Gage and Sons, V K Cattle Company, Frank Coupland, and Lee Magby. (Visual D shows allotments in Otero County and the 11 allotments outside of Otero County.)

Grazing use is primarily by cattle, sheep, and a few saddle horses. (See Appendix D-8 for acreage and grazing capacity by allotment.) The main breed of cattle raised in the area is Hereford with some allotments running Charolais, Brangus, and Brahman crossbreeds. Brangus and Brahman types are usually found on ranches where rough topography and considerable distance to water have an effect on livestock management. The majority of operations are commercial cow-calf enterprises.

There are eight existing AMPs in Otero County. These include: Roy E. Holcomb (7034), Carl and Bill Hansen (7022), Charles R. Walker (7066), Permian Exploration Corporation (7080), Ben Virden (7065), Mary E. Logan (7030), J. P. Cauhape (9006), and Tom W. Runyan (9050).

Production Problems

Major factors affecting livestock production in Otero and parts of Lincoln, Eddy, and Chaves Counties are drought, livestock distribution and stocking rates, and high operating costs with a fluctuating livestock market.

Drought is the major limiting factor of livestock production in the area. Forage production is directly related to the timing, amount, and

intensity of precipitation received. Average rainfall is 8-13 inches. Drought influences many characteristics of vegetation such as vigor, production, composition, cover, and mortality (Pieper and Donart 1975). Frequent and prolonged drought tends to lower conception rates, calf weaning weights, and daily weight gains for yearlings.

Livestock distribution and stocking rates are two interrelated problems facing the livestock operator. Flexible stocking rates can be worked out with the permittee to take advantage of additional forage or, if necessary, temporary nonuse during drought years. Poor distribution is evidenced by uneven utilization patterns within pastures. Livestock move over any pasture in response to the number and location of watering facilities, topography, forage, and size of pasture (Herbel and Gould 1980). Salting, protein supplements, fencing, shading, and rubbing posts can be used to improve livestock distribution. Lack of water is the major factor determining grazing patterns. Additional waters and other rangeland developments can redistribute grazing animals. Proposed rangeland developments are listed in Appendices D-5, D-6, and D-7.

Operating costs increased from 1980 to 1982. Labor, electricity, machinery, equipment, fuel, rangeland improvement maintenance costs, etc., accounted for the increase. Prices received by ranchers in 1982 were below those received in 1978-1981 and comparable to those received in 1976 indicating that 1982 was not favorable in terms of net income for ranchers.

WILD BURROS

The best available information indicates a small herd of burros is confined to and within all pastures of the Permian Exploration Corporation allotment and the Stephenson Ranch, Inc., which is within the Roswell District (Sections 3 and 15 allotments). Currently, a herd management area has not been designated nor fully determined. It is also highly probable that the wild burros use portions of the U.S. Forest Service land along the eastern boundary of the Permian Exploration Corporation allotment and also parts of the Mescalero Indian Reservation. This assumption is based on the fact that the fences along these boundaries are not adequate to prevent burros from crossing, either by crawling under or over the fence, or going through washed out water gaps in arroyos following heavy thundershowers.

Records indicate that a herd of about 12 head utilize this area. This is based on actual counts made using helicopters, pickups, and riding horseback. Herd size is further substantiated through rancher sightings.

Observations made at various locations and over many months do not indicate any one area being used solely during any one period. The burros have been observed in all seasons throughout the area. Ranchers in the area have verified general travel over the Godfrey Hills when the animals move either west or east. Definite foaling areas are not known at this time. A more thorough study of the animals should be made to determine their habits. Until further studies are made, there is no reason to believe that problems exist which may affect the burros' habitat.

Records indicate the burros in the herd are in excellent condition. This is further verified by the ranchers in the area who have observed these animals to be in good health. It is difficult to determine reproductive capacity of the herd due to the lack of studies and the various stories of the origin and past numbers of the burros. Origin of the herd is based on four stories: those left behind by hunters and poachers through the years; those left behind by mining prospectors in the early 1940's; those left behind by the local residents of the area in years past and who have since left the area; and the story of a rancher in the Three Rivers area who reportedly went to Mexico and returned with a sizeable herd of burros he had purchased there. These were apparently turned loose and not fully recaptured.

WILDLIFE

Standard Habitat Sites

The WSRA has been mapped for Standard Habitat Sites (SHS's) based on landforms and vegetation. Seventeen SHS's were identified in Sierra County. (See Visual C, Grazing EIS Southern Rio Grande Planning Area [BLM 1981].) Fifteen SHS's were identified for Otero County and are named and described below. Most of the SHS's identified in Sierra County also were identified in Otero County. (See Table 3-7 for a complete summary of SHS data).

Creosote Rolling Upland (Ladi Rup - 01)

This SHS makes up 26 percent of Otero County. Of this SHS, 68 percent is in poor ecological condition, 23 percent is in fair ecological condition, and 7 percent is in good ecological condition. Slightly more than 1 percent of the vegetation production is by preferred and intermediate browse species, as listed in the Interagency Browse Analysis Handbook. Diversity of terrestrial vertebrate species was moderate for herptiles, mammals, and birds. Assuming an equal distribution of inventory effort, 1 percent of mule deer sightings and almost 2 percent of pronghorn sightings were made in this SHS.

Creosote Hill (Ladi Hill - 03)

This SHS makes up less than 1 percent of Otero County. Of this SHS, 88 percent is in poor ecological condition and 12 percent is in fair ecological condition. There is no measured production of browse species in this SHS. Terrestrial vertebrate diversity for birds is low and there are no data collected for herptiles and mammals. Six percent of mule deer sightings were made in this SHS. There were no pronghorn sightings.

Mixed Shrub Mountain (Mxsh Mtn - 04)

This SHS makes up 3 percent of Otero County. Of this SHS, 16 percent is in poor ecological condition, slightly more than 46 percent is in fair ecological condition, and 37 percent is in good ecological condition. About 5.5 percent of the vegetation production is by preferred

TABLE 3-7
STANDARD HABITAT SITE COMPARISON DATA[a/]

Standard Habitat Sites	Acres in Otero County	Diversity Index Mammals	Diversity Index Birds	Diversity Index Reptiles and Amphibians	Total Number of Vertebrate Species Using This SHS	Number of Vertebrate Species Reliant as Preferred	Diversity Index Plants	Average Number Plant Species	Production of A and B Browse Species lbs./ac.	Percent in Good Ecological Condition Class	Percent in Fair Ecological Condition Class	Percent in Poor Ecological Condition Class
Creosote Rolling Upland	246,067	1.34	1.96	1.62	198	1	1.31	9.1	.014	7	23	68
Mixed Shrub Mountain	30,713	2.00	1.36	1.27	141	1	1.45	11.5	.13	37	46	16
Mixed Shrub Rolling Upland	80,631	1.43	2.14	1.71	160	0	1.40	10.0	.094	1	36	63
Mixed Shrub Hills	170,816	1.44	2.05	1.64	140	0	1.89	13	.068	31	60	9
Mesquite Rolling Upland	5,981	.91	2.11	ND	87	0	.50	6.5	.020	0	14	86
Mesquite Sand Dunes	53,112	1.01	1.79	.71	88	0	.95	6.6	.117	0	0	99
Grass Flat	64,126	1.78	1.62	1.54	163	2	.75	5.5	.004	28	19	53
Grass Rolling Upland	135,717	1.51	1.93	1.22	178	2	1.02	7.4	.003	3	83	14
Grass Mountain	100,234	1.82	1.72	1.57	156	4	1.54	11.8	.027	28	32	38
Pinyon-Juniper Grass Mountain	18,182	1.77	2.44	ND	156	10	1.92	13.0	.284	4	64	32
Pseudoriparian	7,879	2.09	2.71	1.22	200	1	1.76	11.7	.150	49	33	18
Riparian	524	ND	2.86	ND	138	12	1.58	12.8	.593	63	31	6
Creosote Hill	5,082	ND	1.70	ND	63	0	1.57	10.3	0	0	12	88
Grass Hill	22,745	1.77	1.75	ND	122	0	1.70	11.0	.017	27	72	2
Salt Flat	20,553	ND	1.09	2.49	198	26	.76	4.1	.174	0	9	91

Sources: BLM Integrated Habitat Inventory Classification System Data, 1980-1982.

Notes: a/See Appendix E-1 for methodology.
ND - No data available.

and intermediate browse species. The diversity of terrestrial vertebrate species ranged from high for mammals, moderate for herptiles, and low for birds. Sightings for mule deer were 22 percent with no sightings for pronghorn.

Mixed Shrub Rolling Upland (Mxsh Rup - 05)

Almost 8.5 percent of Otero County makes up this SHS. Slightly more than 63 percent of this area is in poor ecological condition, 36 percent is in fair ecological condition, and 1.5 percent is in good ecological condition. Vegetation production by preferred and intermediate browse species is 5 percent. The diversity of terrestrial vertebrate species is moderate for herptiles, mammals, and birds. Assuming an equal distribution of inventory effort, 1.5 percent of mule deer sightings and 4 percent pronghorn sightings were made in this SHS.

Mixed Shrub Hill (Mxsh Hil - 06)

This SHS makes up 18 percent of Otero County. Of this SHS, 9 percent is in poor ecological condition, 60 percent is in fair ecological condition, and 31 percent is in good condition. Almost 6.5 percent of the vegetation production is by preferred and intermediate browse species. Terrestrial vertebrate species diversity for herptiles, mammals, and birds is moderate. There were 3.5 percent of mule deer sightings and almost 1.5 percent of pronghorn sightings in this SHS.

Mesquite Rolling Upland (Prgl Rup - 09)

Less than 1 percent of Otero County is made up of this SHS. Of this SHS, 86 percent falls in poor ecological condition and only 14 percent is in fair ecological condition. There are no data collected which show good ecological condition. Almost 7.5 percent of the vegetation production is by preferred and intermediate browse species. The diversity of terrestrial vertebrate species is moderate for birds and low for mammals; there are no data collected for herptiles. There were 2 percent of sightings for mule deer and none for pronghorn in this SHS.

Mesquite Sand Dune (Prgl Sdn - 10)

This SHS makes up 5.5 percent of Otero County. Of this SHS, 99 percent is in poor ecological condition and none are in fair or good ecological condition. Production by preferred and intermediate browse species is less than 12 percent of the total vegetation production. Terrestrial vertebrate species diversity is low for herptiles, mammals, and birds. There were no sightings for mule deer or pronghorn in this area.

Grass Flat (Gras Flt - 11)

Otero County is made up of 7 percent of this SHS. Of the SHS, 53 percent is in poor ecological condition, 19 percent is in fair condition, and 28 percent is in good condition. Less than 1 percent of the vegetation production is by preferred and intermediate browse species. Terrestrial

vertebrate species diversity ranges from moderate for herptiles to low for both birds and mammals. Mule deer sightings were less than 1 percent and pronghorn sightings were at 23 percent.

Grass Rolling Upland (Gras Rup - 12)

This SHS makes up 14 percent of Otero County. The ecological condition of this SHS is 14 percent in poor condition, 83 percent in fair condition, and 3 percent in good condition. Vegetation production by preferred and intermediate browse species is less than 1 percent of the total vegetation production. The diversity of terrestrial vertebrate species is moderate for herptiles, mammals, and birds. There were no sightings of mule deer; however, 46 percent of pronghorn sightings were in this SHS.

Grass Mountain (Gras Mtn - 13)

Otero County is made up of 10.5 percent of this SHS. Of the SHS, 38 percent is in poor ecological condition, 32 percent is in fair condition, and 28 percent is in good condition. Slightly less than 3 percent of the vegetation production is by preferred and intermediate species. Terrestrial vertebrate diversity is moderate for herptiles and mammals, but low for birds. Mule deer and pronghorn sightings were 3 percent and 0 percent, respectively.

Pinyon-Juniper Grass Mountain (Pjgr Mtn - 14)

Two percent of this SHS makes up the Otero County portion of the Resource Area. Of this SHS, 32 percent is in poor ecological condition, 64 percent is in fair condition, and 4 percent is in good condition. Seventeen percent of vegetation production is by preferred and intermediate browse species. The diversity of terrestrial vertebrate species is high for birds, moderate for mammals, and there were no data collected for herptiles. The sightings for mule deer were 25 percent and 0 percent for pronghorn.

Pseudoriparian (Prip - 15)

Less than 1 percent of Otero County is made up of this SHS. Of this, 18 percent is in poor ecological condition, 33 percent is in fair ecological condition, and 49 percent is in good condition. Fourteen percent of the vegetation production is by preferred and intermediate browse species. Vertebrate species is low for herptiles and high for both mammals and birds. The mule deer sightings were 32 percent and there were no sightings for pronghorn.

Riparian (Rip - 16)

This SHS includes a very small percentage (.05 percent) of Otero County. The ecological condition is 6 percent in poor condition, 31 percent in fair condition, and 63 percent in good condition. However, 62 percent of vegetation production is by preferred and intermediate species. There were

no data collected for mammals or herptiles in the terrestrial vertebrate diversity category, but data collected for birds showed a high diversity. There were also no data collected for sightings of mule deer or pronghorn.

Grass Hill (Gras Hil - 21)

This SHS makes up almost 2.5 percent of Otero County. Of this area, 2 percent is in poor ecological condition, 72 percent is in fair ecological condition, and 27 percent is in good condition. One percent of the vegetation production is by preferred and intermediate browse species. The density of vertebrate species is low for birds and moderate for mammals. There were no data collected for herptiles. Slightly more than 1.5 percent of mule deer sightings and more than 2 percent of pronghorn sightings were made.

Salt Flat (Salt Flt - 22)

This SHS makes up 2 percent of Otero County. The majority (91 percent) of the ecological condition is in poor status; 9 percent is in fair condition, and there were no data for good condition. Ten percent of the vegetation production is by preferred and intermediate species. The terrestrial vertebrate density in this SHS is high for herptiles and low for birds. There were no data collected for mammals. No sightings for mule deer or pronghorn were recorded.

The methodology used in this section can be found in Appendix E-1.

Special Habitat Features (SHFs)

SHFs were inventoried during the White Sands inventory and included the features shown in Table 3-8. The significance of the SHFs as a component of wildlife habitat is difficult to quantify from the inventory data available. However, the number of species observed at waters (cold springs, windmills, and stock ponds) indicates a significant value of both man-made and natural waters.

TABLE 3-8
SPECIAL HABITAT FEATURES

Standard Habitat Feature Name	Typical Animal Occurrence	Number of Features Inventoried	Number of Species Observed
Seeps	passerine birds, coyotes, deer, amphibians	8	8
Cold Springs	owls, passerine birds	19	86
Temporary Ponds	shore birds	2	4
Small Natural Ponds	most species	1	21
Buildings	owls, passerine birds, coyotes, rabbits, bats	2	3
Windmills	raptors, passerine birds, big game	51	199
Stock Ponds	ducks, game birds, passerine birds, bats, deer, pronghorn	185	151

Source: BLM Integrated Habitat Inventory Classification System Inventory Files, 1980-1982.

Terrestrial Wildlife

Wildlife in the Resource Area is diverse. A listing of wildlife species in Otero County and the SHS's which they utilize can be found in the Management Situation Analysis for the Resource Area, available in the WSRA Office. A similar listing for Sierra County can be found in the Grazing EIS Southern Rio Grande Planning Area, Appendix D-1 (BLM 1981).

Big Game

Big game numbers are fairly high in much of Otero County. Map 3-4 shows the herd units and estimated populations for deer and pronghorn, the most important big game species in the area. Table 3-9 shows relative big game use of the SHS's. Big game populations and AUMs by grazing allotment are shown in Appendix E-3.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Las Cruces District Las Cruces NM

WHITE SANDS RESOURCE AREA

MAP 3-4

BIG GAME POPULATION AREAS

Sacramento Deer Herd Unit

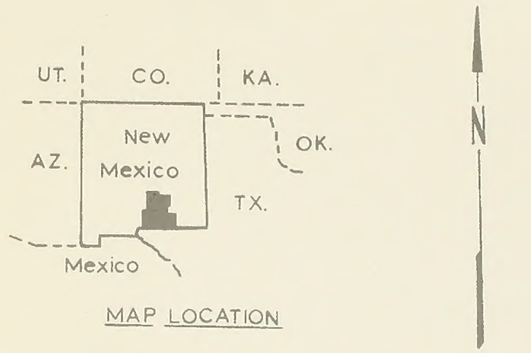
Guadalupe Deer Herd Unit

Alamo Mesa Pronghorn Herd Unit

Deer Winter Range

Division between areas of different population densities. Present (P) and Optimum (O) populations per section.

Source: NM Department of Game and Fish and BLM Las Cruces District Files 1984.



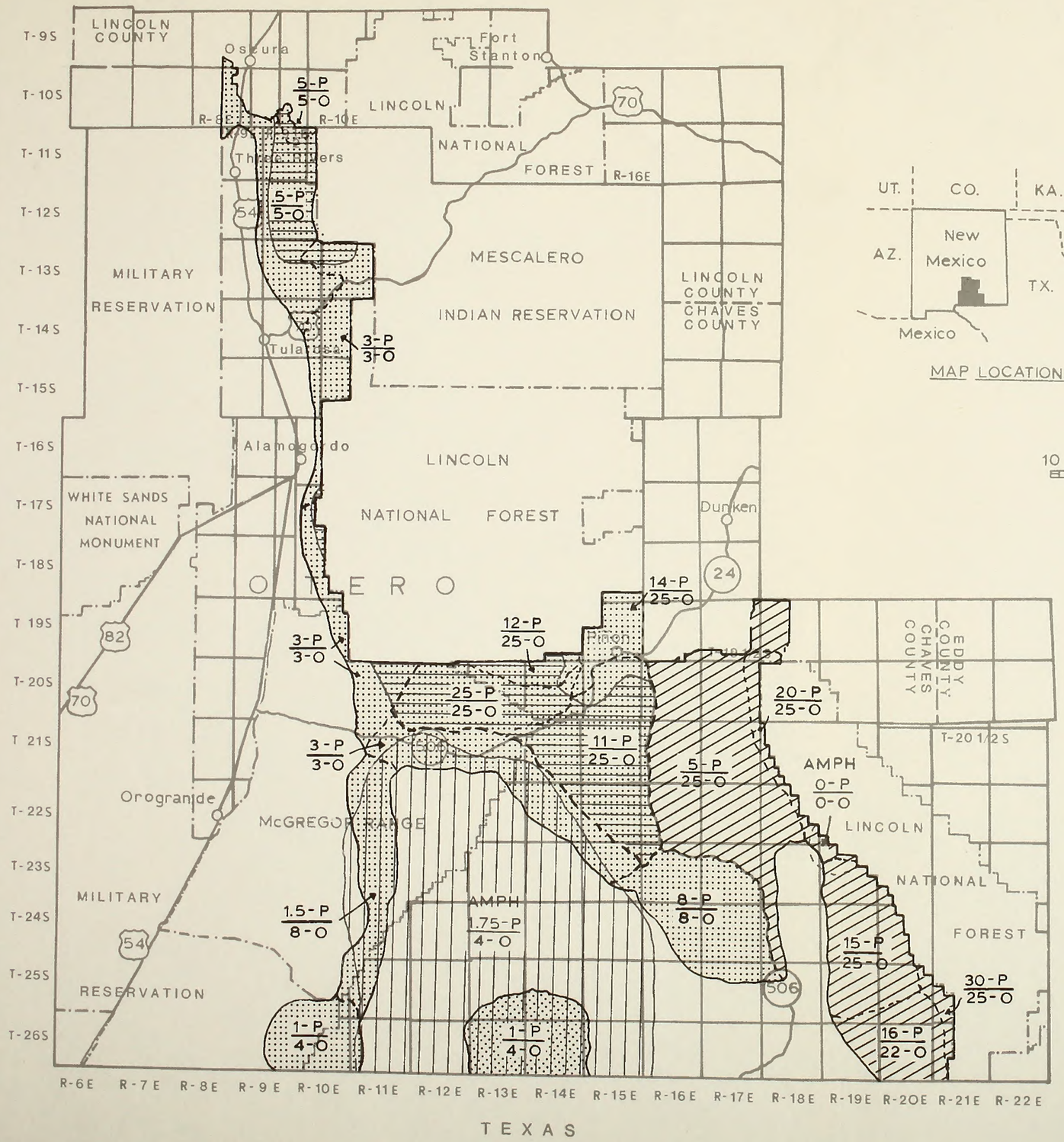


TABLE 3-9
BIG GAME USE OF STANDARD HABITAT SITES

Standard Habitat Sites	Percent Mule Deer Occurrences	Percent Pronghorn Occurrences
Creosote Rolling Upland	1%	2%
Creosote Hill	6%	0%
Mixed Shrub Mountain	22%	0%
Mixed Shrub Rolling Upland	2%	4%
Mixed Shrub Hill	3%	1%
Mesquite Rolling Upland	2%	0%
Mesquite Sand Dune	0%	0%
Grass Flat	1%	24%
Grass Rolling Upland	0%	46%
Grass Mountain	3%	0%
Pinyon-Juniper Mountain	25%	0%
Pseudoriparian[a/]	33%	0%
Riparian	ND	ND
Grass Hill	2%	23%
Salt Flat	0%	0%

Source: BLM Las Cruces District Wildlife Inventory Files, 1984.

Notes: a/Pseudoriparian numbers were arbitrarily divided in half. Vegetation transects by wildlife personnel should have resulted in high numbers compared to the other SHS's.
ND -- No Data.

According to information jointly developed by the New Mexico Department of Game and Fish and BLM, Las Cruces District, the present population of deer for public land in Otero County is about 5,955. Based on observation records during the inventories, about 2,000 of these deer (33 percent) are found in the pseudoriparian standard habitat site, 25 percent of deer occurrence is in the pinyon-juniper habitat site, and 22 percent is in the mixed shrub habitat site. Deer observation occurs predominantly in the shrubby vegetation types. Deer occur in small numbers through most habitats. Observations were not made in only three habitat sites (mesquite sand dune, grass rolling upland, and salt flat); however, some deer probably use these three habitat sites.

Deer rely on browse for food, especially when other forage, such as forbs, is in short supply. Deer observation records during the inventory were highest in habitat sites where production of preferred browse species was highest, with the exception of the riparian habitat site, where there were no observation records for deer and preferred browse production was highest. This may have been because of the small amount of riparian habitat sampled. Deer also require cover, which may be either topographic or vegetative. The shrub species which provide browse also provide cover.

Most of the deer in the area are mule deer. There were a few observations of white tail deer in the pinyon-juniper habitat site.

An estimated 731 pronghorn occur in the area. The habitat types used most by pronghorn are grass rolling upland (46 percent), grass flat (23 percent), and grass hill (22 percent). Eight of the habitat types with significant shrub or tree cover were apparently not used by pronghorn.

Small Game

Major species of upland game birds include Gambels' quail, scaled quail, and mourning dove. Gambels' quail occur in the more mesic habitat sites, whereas scaled quail utilize those that are more xeric. Population numbers of quail, both Gambels' and scaled, fluctuate, depending in part on precipitation and quality of habitat. Mourning dove occur throughout the Resource Area with concentrations favoring those areas where water is present. Other upland game birds occurring in the Resource Area include white wing dove and band-tail pigeon. Jackrabbits and cottontail rabbits are also common in the area, utilizing most habitat sites.

Nongame

Many nongame species, which include raptors, small mammals, birds, reptiles, and amphibians, occur throughout the Resource Area. Lake Holloman, a man-made impoundment, provides a perennial source of freestanding water and receives use from a variety of shorebirds. A listing of wildlife species in Otero County and the SHS's which they utilize is contained in the Management Situation Analysis, which is available for review in the WSRA Office. A similar listing for Sierra County can be found in the Grazing EIS Southern Rio Grande Planning Area, Appendix D-1 (BLM 1981).

Waterfowl

Waterfowl occurrences in the WSRA are limited to those habitat sites where freestanding water is available. Earthen stock tanks are utilized seasonally; however, habitat along the Rio Grande, and in Caballo and Elephant Butte Reservoirs and Lake Holloman, is more abundant and desirable.

Fisheries

Fisheries in the Resource Area include Caballo Reservoir, Elephant Butte Reservoir, portions of the Rio Grande, Three Rivers, and Tularosa Creek. Appendix D-1 in the Grazing EIS Southern Rio Grande Planning Area (BLM 1981) shows species occurrence in the Caballo and Elephant Butte Reservoirs and the Rio Grande. Records indicate that Three Rivers contains some concentrations of brook trout which is the sole species known to occupy this aquatic habitat. The Tularosa Creek contains both rainbow and brown trout. The reservoirs in Sierra County are not managed by BLM and the public land along the streams is not sufficient to permit fisheries management.

Threatened or Endangered Fauna Species

Table 3-10 lists Federal listed, Federal candidate, and State listed animal species in the Resource Area. Preferred habitat, general distribution, and management recommendations are summarized in the table.

RECREATION

The Resource Area provides a variety of recreational opportunities. These opportunities occur in two categories: dispersed and developed.

Dispersed

Dispersed recreational opportunities are independent of recreational developments. These opportunities generally occur in natural or rural settings and contact with others is infrequent on trails and away from roads. Dispersed activities in the Resource Area include: hiking, camping, picnicking, sightseeing, rockhounding, hunting, and recreational off-road vehicle (ORV) use.

Dispersed camping, picnicking, sightseeing, and hiking opportunities are found throughout the Resource Area. These recreational activities generally occur near the Resource Area's major population centers of Truth or Consequences and Alamogordo or in the Resource Area's mountain ranges.

Rockhounding occurs throughout the Resource Area. The higher quality collecting areas are located in Sierra County and attract collectors from both the local and regional publics.

Deer and pronghorn are the more common species hunted in the Resource Area. Although the number of deer hunters in the area is low, they tend to be concentrated in the foothills of the Guadalupe, Sacramento, and San Andres Mountains, and in the Caballo, Cuchillo, and Cornudas Mountains. Hunting pressure in these areas is light to moderate.

A special entry deer hunt is held on McGregor Range. Each year for the past 3 years, 700 permits have been issued for this 2-day hunt. Pronghorn are hunted on the Otero Mesa during a special entry 2-day hunt. One-hundred permits are issued annually for this hunt.

Recreational ORV use occurs throughout the Resource Area. This use can be characterized in two broad categories. For the first category, ORVs are used to transport recreationists to recreation sites. These users usually drive on existing roads and trails. Hunters are the most common group who use ORVs in this method. A small amount of this use occurs throughout the Resource Area. For the second category, using ORVs is the recreational activity. This type of use includes motorcycle racing and hill climbing. This group is more likely to drive off-road for the excitement, challenge, and risk. This type of use is currently occurring in moderate amounts around the Resource Area's two major population centers: Truth or

TABLE 3-10
THREATENED, ENDANGERED, OR SENSITIVE ANIMAL SPECIES IN THE WSRA[a/]

Common Name	Status	Preferred Habitat(s)	General Distribution	Remarks/Management Recommendations
Black-Tailed Prairie Dog (Tularosa)	S-II	Grass Flat, Grass Rolling Upland	Tularosa Basin	Protect existing towns and possibly reintroduce into suitable habitat.
Olivaceous Cormorant	S-II	Riparian (woodland), Stock Tanks	Rio Grande Valley	Protect tracts of riparian habitat.
Bald Eagle	F-E, S-II	Riparian, Lakes, Stock Tanks	Possible Areawide	Protect riparian habitats; protect eyries if found.
Peregrine Falcon	F-E, S-I	Cliffs, Water, Possible Areawide	Possible Areawide	Most occurrences are transients; protect eyries if found.
Aplomado Falcon	S-I	Grass Habitat Types	Areawide	Extripated. Recovery may include grassland improvement.
McCown's Longspur	S-II	Grass Mountain, Other Grass Types	Potential Areawide	Promote grass seed production, winter grass cover.
Whooping Crane	F-E, S-II	Marsh, Lake, Riparian, Stock Tanks	Potential Areawide	Maintain ground cover in wetland/riparian areas/stock ponds.
Varied Bunting	S-II	Mesquite (dense stands), Other Shrublands	Sierra County	Protect pseudoriparian habitats, other dense shrub areas.
Trans-Pecos Rat Snake	S-II	Shrub Types	Primarily Rio Grande Valley	Protect species from collecting.
Sacramento Mountain Salamander	S-II	Spruce-Fir	Sacramento Mountains	All known locations on U.S. Forest Service-managed lands.
Silvery Minnow	S-II	Pools in large streams	Rio Grande	N/A

Sources: Hubbard et al., 1979.
BLM Integrated Habitat Inventory Classification System Inventory Files, 1980-1982.

Notes: a/Information on additional species, Grazing EIS Southern Rio Grande Planning Area, Table 2-9, page 2-22.
F-E -- Federal Endangered.
S-I -- State Group One (Endangered).
S-II -- State Group Two (Threatened).
N/A -- Not Applicable.

Consequences and Alamogordo. Currently, moderate recreational ORV use is occurring in the sand dunes around the Jarilla Mountains and north of Orogrande. An annual enduro in this area draws over 250 contestants from several states. Small amounts of this use also occur in the more remote portions of the Resource Area.

Recreational ORV use is projected to change with changes in population. The projected increase in population for the Resource Area is approximately 15,100 by the year 2000. If 10 percent of these additional people use ORVs, there would be an insignificant increase of ORV users of approximately 1,510.

Developed

The Three Rivers Petroglyph Site and Picnic Area is the only developed site managed by BLM in the Resource Area. Three Rivers is managed to protect and interpret the area's unique cultural resources, which include over 5,000 petroglyphs and a restored prehistoric Indian village. Facilities include picnic shelters and tables, drinking water, hiking trails, and toilets. Visitor estimates vary between 11,500 and 20,000 visits annually.

Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum (ROS) inventory was completed in 1984 for the Resource Area. (See Map 3-5.) Table 3-11 illustrates the acreage for each class by county. The methodology used in determining ROS classes is found in Appendix F.

TABLE 3-11
RECREATION OPPORTUNITY SPECTRUM ACREAGE CLASSIFICATIONS BY COUNTY

Opportunity Classification	Sierra County	Otero County
Urban	9,100 acres	7,700 acres
Rural	49,200 acres	12,000 acres
Roaded Natural	305,500 acres	214,100 acres
Semiprimitive Motorized	1,099,200 acres	454,000 acres
Semiprimitive Nonmotorized	97,300 acres	220,400 acres
Primitive	-0- acres	-0- acres

Source: BLM Las Cruces District Office Files, 1984.

VISUAL RESOURCES

The inventory of visual resources and development of Visual Resource Management (VRM) classes were completed for Sierra County in 1977 and for Otero County in 1980. (The VRM classes for Sierra County are

contained in the Grazing EIS Southern Rio Grande Planning Area [BLM 1981]; for Otero County, they are shown on Map 3-6.) A discussion of the inventory and evaluation process is presented in Appendix G. In addition to the development of VRM classes, the VRM inventory results in the identification of potential Areas of Critical Environmental Concern (ACECs) for visual resources.

One potential ACEC for visual resources, the Sacramento Escarpment, has been identified in Otero County. The Sacramento Escarpment, once a BLM Wilderness Study Area (WSA), was considered in part because of its outstanding opportunities for solitude, outstanding opportunities for a primitive and unconfined type of recreation, and presence of historical and archaeological supplemental values. The canyons provide isolation and foot access to a contiguous Forest Service Roadless Area. The City of Alamogordo and developments along U.S. Highway 54 can be seen from exposed areas along the western fringe. For several years, conservation groups have sought special management for this area.

WILDERNESS

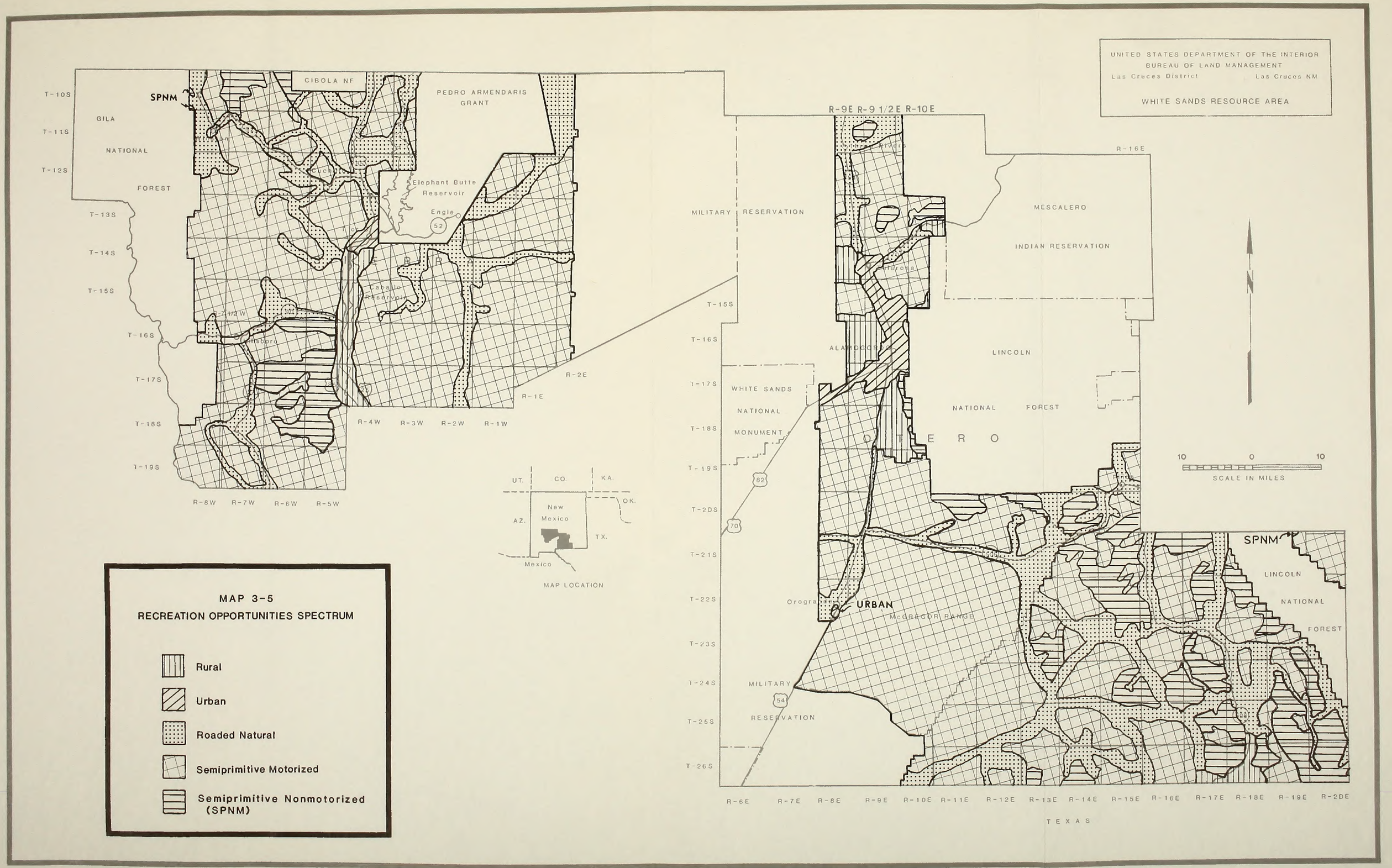
As part of the wilderness review process, BLM designated three Wilderness Study Areas (WSAs) in the Resource Area. These are listed in the Table 3-12 and are shown on Map 3-6.

TABLE 3-12
WILDERNESS STUDY AREAS IN THE WSRA

Name	Number	Acreage
Jornada del Muerto	NM-020-055	31,147
Brokeoff Mountains	NM-030-112	31,386
Culp Canyon	NM-030-152	10,937

Source: BLM Las Cruces District Office Files, 1984.

The Brokeoff Mountains WSA has been recommended nonsuitable and the Jornada del Muerto has been recommended suitable for wilderness designation. (See the Las Cruces District Wilderness Final Environmental Assessment, 2 volumes, 1984.) Further analysis of these areas will occur in the Statewide Wilderness EIS. Final wilderness decisions will be made by Congress. Wilderness study of the Culp Canyon WSA has been deferred because it is located in the northern part of the Army-controlled McGregor Range. Currently, legislation is being proposed to withdraw the Range for military uses. Future wilderness study of Culp Canyon is dependent on restrictions and boundaries of the final withdrawal. All of the above areas are presently being managed in accordance with the Interim Management Policy and Guidelines for Lands Under Wilderness Review (BLM 1979; revised 1983) in order to prevent impairment of their wilderness values.

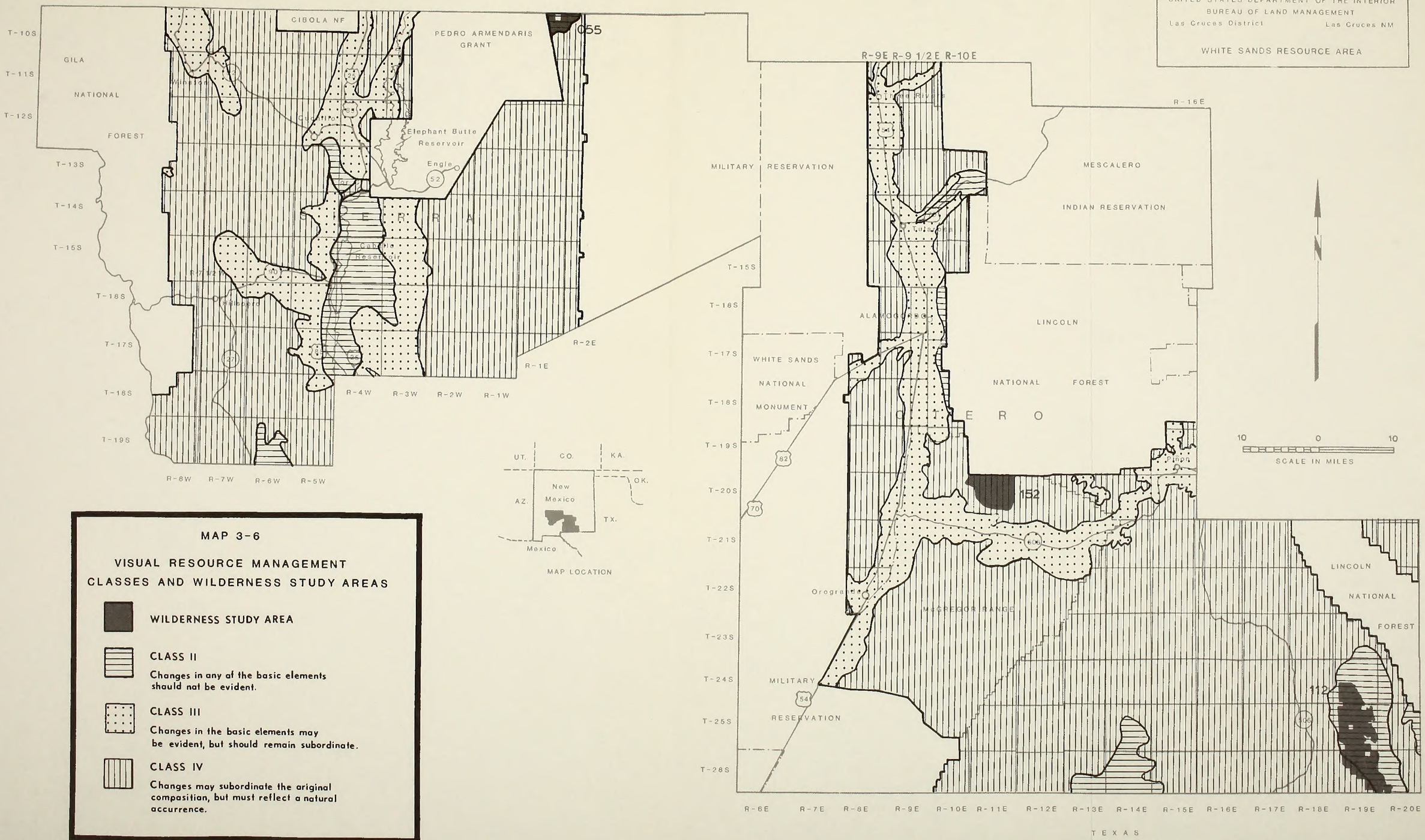


SOURCE: BLM Las Cruces District Files 1984.

MAP 3-5 Recreation Opportunities Spectrum

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Las Cruces District — Las Cruces NM

WHITE SANDS RESOURCE AREA



MAP 3-6

VISUAL RESOURCE MANAGEMENT CLASSES AND WILDERNESS STUDY AREAS

WILDERNESS STUDY AREA

CLASS II
Changes in any of the basic elements should not be evident.

CLASS III
Changes in the basic elements may be evident, but should remain subordinate.

CLASS IV
Changes may subordinate the original composition, but must reflect a natural occurrence.

SOURCE: BLM Las Cruces District Files 1984.

MAP 3-6 VRM Classes and WSAs

CULTURAL RESOURCES

A BLM Class I Survey covering the entire Resource Area has been conducted by the Office of Contract Archaeology for prehistoric resources (LeBlanc and Whalen 1980) and by New Mexico State University for historic resources (Wilson 1975). A 5 percent Class II Survey for a portion of Sierra County was conducted by the University of Texas for planning in geothermal exploration (Hester 1977). A 10 percent survey of the Three Rivers drainage was performed by Human Systems Research (Wimberly and Rogers 1977). Numerous Class III Surveys have been conducted in the Resource Area for various projects. Results of the various projects in the Resource Area show that a little under .02 percent of the area has been surveyed, locating 244 sites. A total of over 13,290 sites is projected for the entire Resource Area (Table 3-13).

TABLE 3-13
CULTURAL RESOURCE SURVEYS a/

Name	Year	Type	Acreage/Sites a/
BLM Inhouse	1975-1984	Class III	3,502/ 55
Contract Surveys	1975-1984	Class II	12,279/ 67
McGregor Range	1976	Class II	100,000/171 b/
Rattlesnake Hill	1976	Class III	832/ 81
Human Systems Research	1977	Class II	980/ 10 c/
University of Texas	1977	Class II	14,520/ 31
Total			32,113/244
Average Site Density			1 site per 319 acres 2 sites per square mile

Source: BLM Las Cruces District Survey Report Files, 1984.

Notes: a/These figures are approximate in that only those surveys were used where acres could be estimated. The figures include State and private lands in the Resource Area as well as Federal land, except where sites were obviously on private land (i.e., the Rio Grande Valley). In some survey reports, it was impossible to obtain exact acreages. Since there are 1,754,265 public land acres in the Resource Area, this represents less than 1 percent surveyed.

b/This figure is only approximate because of survey areas overlapping the southern boundary of the Resource Area and exact acreages not being recorded for some surveys.

c/This figure represents only public land surveyed and sites located on public land.

As of February 1984, the Museum of New Mexico Archaeological Records Management System (ARMS) compiled a total of 129 prehistoric and 10 historic sites on public land in the area. Because of multiple occupations of some sites over a long period of time, some site cultural affiliation is recorded more than once. Cultural affiliation and chronological divisions for the Resource Area are shown in Table 3-14. Map 3-7 illustrates some historic sites, historic trails, areas of survey, and possible areas of high and low site density. High site density is defined as the frequent occurrence of sites regardless of affiliation or site type.

TABLE 3-14
CULTURAL PERIODS AND RESOURCE AFFILIATION IN THE RESOURCE AREA

Affiliation	Date[a]	Total Number of Sites in Resource Area	Percent of All Sites in Resource Area
Paleo Indian	13,500 BC - 7000 BC	3	2
Archaic	7,000 BC - 200 BC	6	4
Mogollon (no branch)	200 BC - 1450 AD	61	43
Apache	1500 AD - present	1	1
Historic	1581 AD - present	10	7
Indeterminate	all prehistoric periods	62	43
TOTAL		143	100

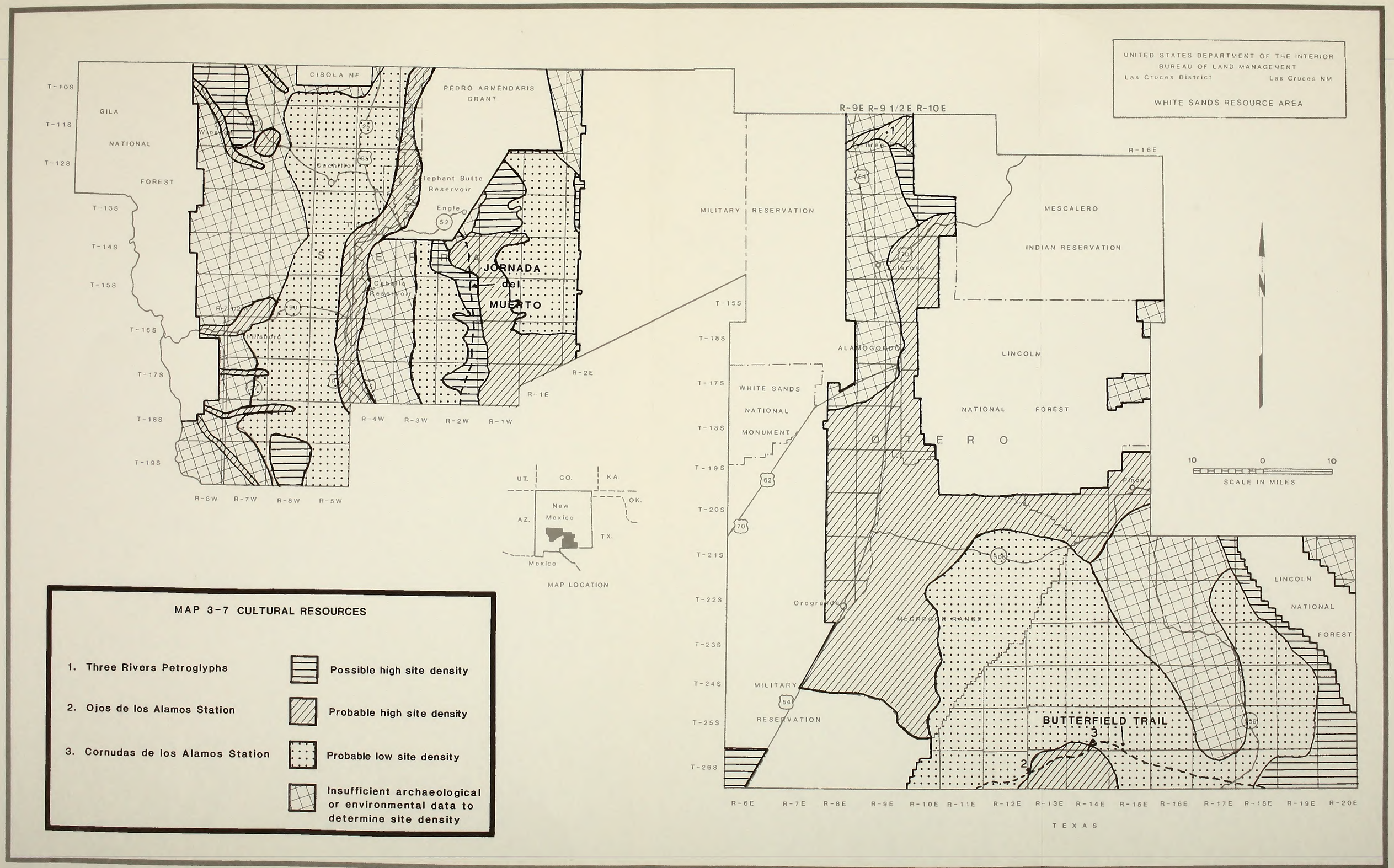
Source: BLM Las Cruces District Office Files, 1984.

Note: a/Many of these dates may be altered by further archaeological and historical studies.

Table 3-15 correlates known cultural sites with the major vegetation categories in the Resource Area. This indicates that the majority of sites have been recorded in the desert scrub areas. The ARMS file does not differentiate between mesquite and creosotebush. The physical condition of the sites in the Resource Area is tabulated in Table 3-16, indicating that most of the site conditions are good according to the ARMS file.

There are five sites in Sierra and Otero Counties that are listed on the National Register of Historic Places (Federal Register, Vol. 44, No. 26, February 6, 1979; Vol. 45, No. 54, Tuesday, March 18, 1980; all subsequent volumes with a New Mexico listing). None are on public land.

There are several sites in the Resource Area that are not on the National Register, but are highly significant. The Three Rivers Petroglyph Site is the largest concentration of Mogollon petroglyphs in existence, as well as a large pithouse and pueblo village. It is currently administered



SOURCE: BLM Las Cruces District Files 1984.

MAP 3-7 Cultural Resources

TABLE 3-15
CORRELATION BETWEEN CULTURAL SITES
AND VEGETATION TYPES IN THE RESOURCE AREA

Vegetation Type	Number Sites	Percent Sites
Desert Scrub[a]	108	78
Grassland	27	20
Forest	1	1
Scrubland	2	1
Woodland	1	1
TOTAL	139	

Source: BLM Las Cruces District Office Files, 1984.

Note: a/The ARMS files do not break the vegetation types more finely for the desert scrub type. Earlier EIS's indicate that the bulk of the sites in the Resource Area are in the mesquite zone.

TABLE 3-16
PHYSICAL CONDITION OF CULTURAL SITES
IN THE RESOURCE AREA[a]

Condition	Number
Good	78
Fair	16
Poor	33
Destroyed	11

Source: BLM Las Cruces District Office Files, 1984.

Note: a/Because much of the data were recorded before the 1970's, the conditions of many of these sites has probably changed for the worse. Since the table includes all recorded sites in the Resource Area, many sites on private land in the Rio Grande Valley have probably been destroyed since they were recorded. Sites on public land are probably less affected by construction and agricultural land clearance than those on private land; therefore, they may be in somewhat better condition except near areas of high population density.

by the BLM as a recreation and interpretive area. The Alamo Mountain Petroglyph Site is a large concentration of Mogollon petroglyphs and several Apache petroglyphs. In addition, the area contains a Butterfield Trail stage station. The Rattlesnake Hills archaeological district is a large concentration of El Paso Phase Jornada Mogollon sites. The Jornada del Muerto Trail was part of the main road that connected Santa Fe with Mexico; there are a number of segments of the Trail on public land.

The Lone Butte area is known to contain a Folsom campsite. It is one of several known Folsom campsites in the Tularosa Basin and contains the potential of adding important data about a very early phase in the occupation of North America. A large El Paso Phase pueblo is located on the west side of the Jarilla Mountains. It probably contains several dozen rooms buried under the sand. Some of the sites on the McGregor Range are large El Paso Phase villages located along drainages emerging from the Sacramento Escarpment. The Escondido site and Site No. 030-200 are some of the largest El Paso Phase sites in existence.

Although no specific effort was made to identify specific Native American religious sites, none are known to exist in the Resource Area.

SOCIAL AND ECONOMIC CONDITIONS

Introduction and Description of Study Region

History

In Sierra County, the Apache dominance of the Black Range limited early economic activity. Gold was discovered in 1877 at Hillsboro with additional strikes in other areas. Prior to 1904, mining activity occurred in the Kingston (Black Range), Lake Valley, and Hillsboro mining districts. The Kingston (Black Range) district produced ore having a value of about $6.2 million. The Lake Valley district produced ore having a value of about $5.3 million, and the Hillsboro district had produced ore having a value of $6.8 million. Other districts in the County produced ore having a value of about $1.5 million (State Bureau of Mines and Mineral Resources 1957). Mining activity started to decline by the early 1900's, and cattle ranching and the construction of Elephant Butte Dam were the primary economic activities occurring between the years 1903-1916.

From 1950-1975, Sierra County experienced a growth in government and tourism/retirement and a small growth in agriculture. The greatest growth was in professional jobs at all levels of government (Federal, State, and local). In recent years, Sierra County has been a center for retirement, especially in the Truth or Consequences area, and for tourism at the Elephant Butte Reservoir recreation site.

While tourism/retirement and government are the most important economic factors for the County, agriculture continues to be important. In 1980, agriculture accounted for 15 percent of the civilian labor force for Sierra County.

The railroad played a fundamental role in the early development of Otero County, enabling the County to serve as a trade center for the regional livestock and farming enterprises. Alamogordo, the County seat, was the headquarters for the El Paso Northeastern Railway Company. In the late 1890's, the railway was extended from Alamogordo into the Sacramento Mountains. This extension made the utilization of the timber resources in the area possible. The Alamogordo Lumber Company went into operation at this time, producing railroad ties and bridge timbers for the growing rail system. The El Paso Northeastern Railway Company later became part of the Southern Pacific System and still operates for freight purposes. There are three mining districts in Otero County. The value of production during 1904-1930 was approximately $1.6 million (State Bureau of Mines and Mineral Resources 1957).

In March 1947, the U.S. Army traded Wendover Field, Utah, for the Alamogordo base in order to begin research programs in what became known as the Air Force Missile Base and became the center of activity for the White Sands Missile Range and the Sacramento Peak Solar Observatory at Sunspot. During the 1950's and 1960's, Holloman Air Force Base evolved into a complex of research and testing programs involving military personnel and private contractors.

The extent of Federal control over the Otero County economy is significant. The growth of the defense-oriented technical industry has spurred investments in motels, retail and service businesses, wholesale distributors, and several small industrial firms. Since the economic structure of Otero County is heavily dependent on government expenditures, the present health of the economy is subject to rapid change.

Demography

In 1980, the Resource Area economy (Otero and Sierra Counties) had a population of 53,119 persons (see Table 3-17) with an average annual population growth rate of 1.0 percent between 1970-1980 indicating a slow but even growth rate. Population projections to the year 2000 confirm this trend. (See Table 3-18.) The average annual population growth rate was greater for Sierra County with a 1.76 average annual percent change from 1970-1980. Otero County had an .87 average annual percent change for the same period.

TABLE 3-17
POPULATION OF COMMUNITIES IN THE WHITE SANDS RESOURCE AREA

Community by County	Population Counts by Census Year 1960	1970	1980	Average Annual Percent Change 1970-1980
Otero County	36,976	41,097	44,665	.87
Alamogordo	21,723	23,035	24,024	.43
Tularosa	3,200	2,851	2,536	-1.10
Holloman AFB	N/A	8,001	7,245	-.95
Sierra County	6,409	7,189	8,454	1.76
Truth or Consequences	4,269	4,656	5,219	1.21
Williamsburg	N/A	367	433	1.80
WHITE SANDS RESOURCE AREA	43,385	48,286	53,119	1.0

Source: U.S. Department of Commerce, Bureau of Census, 1982.

TABLE 3-18
WHITE SANDS RESOURCE AREA POPULATION PROJECTIONS

	1980	1990	Average Annual Percent Change 1980-1990	2000	Average Annual Percent Change 1990-2000
Otero	44,800	52,600	1.74	58,600	1.14
Sierra	8,500	9,200	.82	9,800	.65
WHITE SANDS RESOURCE AREA	53,300	61,800	1.60	68,400	1.10

Source: Bureau of Business and Economic Research, 1984.

Population density per square mile for the Resource Area was 4.9 persons. Otero County had a larger population density per square mile at 6.7 persons as compared to Sierra County's 2.0 persons per square mile.

In Sierra County, approximately 29 percent of the population were over age 65, 4.6 percent were age 20-24, and 45.4 percent of all inhabitants were less than 45 years old. In 1980, the median age for the County was 49.1 years, an increase of 5.5 years from the 1970 median age of 43.6 years. In contrast, the 1980 median age for the State was 27.4 years. The

high median age in Sierra County stems from a growing retirement community in the County.

The median age for Otero County in 1980 was 25.6 years, an increase of 14 percent from the 1970 median age of 22.4. This low median age is due largely to the substantial number of military families and young servicemen and support personnel around Holloman Air Force Base. Only 6.6 percent of the population are over age 65, 11.4 percent are 20-24 years of age, and 77.3 percent of all inhabitants are less than 45 years old.

An increasing percentage of the population are living in rural areas in the Resource Area, although the majority still live in Truth or Consequences (61.7 percent of Sierra County) and the Tularosa, Alamogordo, Holloman corridor (75.7 percent of Otero County). For Sierra County, rural dwellers increased by 27.7 percent from 1970 and by 50.6 percent in Otero County for that period.

In 1980, the Resource Area was mainly Anglo in ethnic and racial makeup (68.1 percent), with 22.3 percent of the population being of Spanish descent. Native Americans, primarily Mescalero Apaches, made up 4.1 percent of the population, mainly in Otero County.

Social Setting

Quality of Life

Education levels are highest in the southeastern portion of the Resource Area. In 1980, 42.2 percent of Otero County's population had completed high school, while only 34.3 percent of Sierra County's population were high school graduates. Nearly 35 percent of Otero County also had some post-secondary education compared to 20 percent of Sierra County (U.S. Bureau of the Census 1983).

The Resource Area is served by the 57-bed St. Anne's Hospital in Truth or Consequences and the 79-bed Gerald Champion Memorial Hospital in Alamogordo. In 1978, in spite of both facilities, Otero and Sierra Counties were listed as medically underserved areas; especially lacking were the southern part of Sierra County and the mid-eastern part of Otero County (New Mexico State Planning Division 1982).

Attitudes and Values

Attitudes, values, and beliefs for the Resource Area were compiled largely from the Southwestern New Mexico Social Economic Profile (SEP) and from the Sacramento SEP, completed in 1977.

Attitudes expressed by the residents are derived from local values. For example, ranchers feel agriculture and ranching represent the basis of the human economy and that it should be given priority in the use of public land. These residents express traditional agricultural values of independence, a frontier lifestyle, family, close-knit communities, resistance to change from external groups, some hostility towards these

external groups, and a concern for allocation of resources. They tend to be aware of any activity within the ranch boundary. They feel that they have a financial interest to protect regardless of land ownership patterns. Proposals that increase general public use are not usually favored.

Mining interests are intensely concerned about planning decisions affecting permitted land uses. The companies, engineers, and prospectors seek to keep open access to public land and are supportive of proposals that provide additional access. They oppose expansion of wilderness and roadless areas if these designations obstruct resource development. This opposition stems from the value that mineral production is associated with economic progress and improvement in living standards, quality of life, and human technology.

The conservationists are concerned with the preservation of the wilderness area in the Lincoln National Forest and giving attention to the White Sands pupfish and the southern bald eagle. This group is also concerned with the pronghorn range in the County, as well as expressing a keen interest in the Sacramento Escarpment and the Brokeoff Mountains WSA.

These previously-mentioned areas are of interest to recreationists who support the development of resources for leisure-time activities. Actions which improve access tend to be favored.

Hunters want wildlife conservation on public land and improved access to hunting areas. Hunting is viewed by this group as a recreational release from workday pressures and they believe public land management should incorporate their priorities. They have historically been favorable toward proposals to provide additional access to public land.

ORV users believe that public land should be managed to ensure access to ORVs and motorcycles. These users maintain that "free-wheeling" is a vital expression of the individuality of the ORV club members and many drivers plan their week around leisure-time ORV activities.

Native American attitudes favor development of natural resources on their reservation to enhance the income and employment opportunities of their people.

The space and technology group is concerned with research, large Federal contracts, defense preparedness, education, and applications of space knowledge to solve natural resource problems in the world.

In general, socio-cultural values of the Anglo influence may be divided into two predominant classes. Those residents who have been ranching and farming in the area for many years are characterized by agrarian and small town outlooks which emphasize independence, a self sufficiency, and equality. Conversely, the new residents tend to be more liberal, aggregative, and cosmopolitan in their attitudes towards natural resources, human relationships, and religion.

The Hispanics share certain values and beliefs which serve to separate them from Anglo residents as well as their cultural cohesion and common language. Language and religions strengthen the social role of family units within the Hispanic culture. The Roman Catholic Church is not only a religious organization, but the social focus of Hispanic communities.

The Native Americans hold the old Indian values between man and nature and man and the supernatural. As a tribe, these cultural values have necessarily been secondary to survival. The tribe has been highly concerned about items such as housing, employment, income, and natural resource use and supply.

Structure of the Economy

The assessed valuation (net taxable valuation) for the Resource Area economy was $232.9 million for the 1983-1984 fiscal year. Otero County had a net taxable valuation of $168,583,898 and Sierra County had a net taxable valuation of $64,319,431 for the 1983-1984 fiscal year (New Mexico Department of Finance and Administration, Local Government Division 1984). The 1984 payment in lieu of taxes (PILT) for the Resource Area was just under $1.2 million. The 1984 PILT for Otero County was $878,340 and $295,338 for Sierra County (USDI, BLM New Mexico State Office 1984).

Employment

In 1980, total employment for the Resource Area was dominated by the retail trade sector which accounts for approximately 21 percent of total employment. (See Table 3-19.) The professional and related services sector and the public administration sector account for 20.3 percent and 15.2 percent of total employment, respectively. The manufacturing sector accounts for slightly less than 7 percent of total employment. Reasons for the small manufacturing sector may be a lack of potable water, an unskilled labor force, and the distance of Alamogordo and Truth or Consequences from major metropolitan markets.

The agriculture, forestry, fisheries, and mining sector accounts for 6.4 percent of total employment in the Resource Area. In Sierra County, this sector accounted for 16 percent of total County employment, mainly because of the mining industry here. Conversely, in Otero County, this Sector accounted for slightly less than 5 percent. Table 3-19 gives a further breakdown of the major employment sectors for the Resource Area.

Income

The Resource Area economy had an average per capita personal income of $7,041 in 1980. (See Table 3-20.) This is below the per capita income for the State which in 1980 was $7,889. Otero County has a slightly lower figure of $6,988 as compared to $7,496 for Sierra County. When broken down by industry, the largest distribution of personal income in Otero County in 1980 was in the military sector and in civil service. The Services and Retail Trade Sectors were also large contributors to the economy. For Sierra County, total personal income received was largest in

State and local government with retail trade and services being large employers; thus reflecting the tourism/retirement aspects of Sierra County. The distribution of total personal income for the entire Resource Area is shown in Table 3-21.

TABLE 3-19
MAJOR EMPLOYMENT SECTORS, WHITE SANDS RESOURCE AREA, 1980
(OTERO AND SIERRA COUNTIES)

Sector	Employment	Percent of Total Employed	Percent of Civilian Labor Force
Agriculture, Forestry, Fisheries, and Mining	979	6.4%	5.8%
Construction	1,054	6.8%	6.2%
Manufacturing	1,069	6.9%	6.3%
Transportation	524	3.4%	3.1%
Communications and Other Public Utilities	393	2.6%	2.3%
Wholesale Trade	249	1.6%	1.5%
Retail Trade	3,200	20.8%	19.0%
Finance, Insurance, Real Estate	560	3.6%	3.3%
Business and Repair Services	899	5.8%	5.3%
Personal Entertainment and Recreation Services	999	6.5%	5.9%
Professional and Related Services	3,118	20.3%	18.4%
Public Administration	2,342	15.2%	13.8%
Total	15,386		
Labor Force Status			
Persons 16 Years and Over	38,682		
Labor Force	22,468		
Civilian Labor Force	16,924		
Employed 15,386			
Unemployed 1,538			
Percent of Civilian Labor Force	9.1%		
Labor Force Participation Rate	75.3%		

Source: U.S. Department of Commerce, Bureau of the Census, 1983.

TABLE 3-20
TOTAL PERSONAL INCOME AND PER CAPITA INCOME BY COUNTY, 1980a/

County	Total Personal Income (millions of dollars)	Per Capita Personal Income
Resource Area	$ 374	$7,041
Otero	311	6,988
Sierra	63	7,496
State	10,297	7,889

Source and Note: a/Per capita income calculated by BLM staff based on information from U.S. Department of Commerce, Bureau of the Census, 1980 Census Population, and Bureau of Economic Analysis, Survey of Current Business, Volume 64, No. 4, April 1984.

TABLE 3-21
DISTRIBUTION OF TOTAL PERSONAL INCOME, 1980
WHITE SANDS RESOURCE AREA

Source	Total Personal Income (thousands of dollars)		
	WSRA	Otero County	Sierra County
Farm	$ 10,922	$ 4,566	$ 6,356
Non-Farm	270,779	247,558	23,221
Agricultural Service, Forestry, Fish, and Other a/	473	473	a/
Mining a/	374	374	a/
Construction	11,796	9,125	2,671
Manufacturing	15,473	15,096	377
Transportation and Public Utilities	14,148	11,489	2,659
Wholesale Trade	1,946	1,662	284
Retail Trade	25,849	22,751	3,098
Finance, Insurance, Real Estate	5,901	4,911	990
Services	40,703	37,636	3,067
Federal, Civilian Government	50,973	48,079	2,894
Federal, Military	75,729	75,613	116
State and Local	25,842	20,349	5,493

Source: Bureau of Economic Analysis, 1983.

Note: a/Data for Sierra County not shown to avoid disclosure of confidential information. Data are included in the totals.

Livestock Industry

In Sierra County, on January 1, 1983, the value of cattle, sheep, and chickens was $11,231,400. The livestock inventory for Sierra County as of January 1, 1983, is shown in Table 3-22.

TABLE 3-22
SIERRA COUNTY LIVESTOCK INVENTORY, 1982

Livestock	Inventory (January 1, 1983)
All Cattle	33,000
Beef Cows	11,500
Milk Cows	1,900
Other Cattle	19,600
All Hogs	500
All Sheep	200
All Chickens	1,000

Source: New Mexico Agricultural Statistics, 1982.

In 1982, livestock and livestock products, valued at $12.7 million, accounted for 65 percent of the total farm marketings of all commodities of $19.6 million. The cattle and calves in Sierra County accounted for 43 percent of the County's total receipts from farm marketings (New Mexico Agricultural Statistics 1982).

The value of all cattle, sheep, and chickens for Otero County on January 1, 1983, was $11.3 million. (See Table 3-23.)

TABLE 3-23
OTERO COUNTY LIVESTOCK INVENTORY, 1982

	Inventory (January 1, 1983)
All Cattle	31,000
Beef Cows	19,000
Milk Cows	50
Other Cattle	11,950
All Hogs	2,800
All Sheep	17,000
All Chickens	2,500

Source: New Mexico Agricultural Statistics, 1982.

In 1982, cash receipts from farm marketings of all commodities in Otero County were $11.2 million, up 12.6 percent from 1981 and down 44 percent from 1980 cash receipts of $20.3 million. Livestock and livestock products valued at $9.2 million accounted for 82 percent of the total, while crops totaled $2.1 million to make up the remaining 18 percent. The cattle and calves in Otero County accounted for 70 percent of the total receipts from farm marketings (New Mexico Agricultural Statistics 1982).

For the Resource Area, the value of all cattle, sheep, and chickens was estimated to be $23.9 million in 1982. The cash receipts for the Resource Area of $30.8 million from farm marketings of all commodities were down from the 1980 total of $41.4 million. The totals from Sierra County were somewhat higher with $19.6 million for 1982 compared to $11.2 million for Otero County. Cattle and calves make up 52.5 percent of the Resource Area's total receipts from total farm marketings (New Mexico Agricultural Statistics 1982).

There are 52 cow-calf operations and 8 cattle and sheep operations that were used for analysis purposes in Otero County who use BLM land for their operations. There are seven cow-sheep operations that were not analyzed because of the lack of available data to construct the ranch budgets. These operations had an average animal unit (AU) of 63 which would have placed them in the subsistence cow-sheep category. The primary source of revenue for these operators is generally derived from off-ranch employment. It should be noted that these operations may be affected to a greater degree under the various alternatives since they are heavily dependent (72.4 percent) on public land. The ranch operations for Sierra County were analyzed in the Grazing EIS Southern Rio Grande Planning Area (BLM 1981). The operations that are classified as cattle and sheep operations are those in which over half of the AUs are sheep. There are 136,346 animal units months (AUMs) which are currently used for grazing (5-year average). At the 1983 grazing rate of $1.40 per AUM, this totals $190,884 in grazing fees. The 1984 rate of $1.37 per AUM totals $186,794 in grazing fees. Total preference is 147,916 AUMs, which have a value for borrowing purposes of approximately $14.8 million, assuming a $100 per AUM loan value.

In 1982, these ranch operations had an estimated $3.5 million in livestock sales. (See Table 3-24.) Total receipts amounted to $3.4 million after an allowance was made for noncash receipts and livestock perquisites. Returns to operator labor, management, and capital was $486,000.

Individual budgets were constructed for each size operation that use BLM land and were classified into four categories: Small Cow/Calf Operation (1-199 AUs), 34 operators; Medium Cow/Calf Operation (200-499 AUs), 13 operators; Large Cow/Calf Operation (500+ AUs), 5 operators; and Medium Cow/Sheep Operation (200-600 AUs), 8 operators. Approximately 83 percent of these operators depend on public land for more than 50 percent of their operation. Their dependency on public land for grazing averages 67 percent. The dependency for the various categories using preference are as follows: Small Cow/Calf Operation, 71 percent;

Medium Cow/Calf Operation, 70 percent; Large Cow/Calf Operation, 67 percent; and Medium Cow/Sheep Operation, 62 percent. (See Appendix I-1 for additional information on ranch budgets.)

TABLE 3-24
ESTIMATED COSTS AND RETURNS FOR ALL RANCH OPERATIONS, 1982a/

	Small Cow-Calf	Medium Cow-Calf	Large Cow-Calf	Medium Cow-Sheep	Total All Operations
Livestock Sales	$570,010	$767,650	$1,329,020	$848,032	$3,514,712
Noncash Receipts	-2,550	-38,155	-86,615	10,400	-116,920
Livestock Perquisites	8,568	5,070	5,985	3,392	23,015
Total Receipts	576,028	734,565	1,248,390	861,824	3,420,807
Variable Costs	372,470	435,851	618,430	285,824	1,712,575
AUM Costs	92,684	85,826	105,400	73,240	357,150
Returns Above Variable Costs	110,874	212,888	524,560	502,760	1,351,082
Fixed Costs	72,488	45,436	71,980	56,376	245,980
Depreciation	180,948	143,117	125,205	169,304	618,574
Returns	-142,562	24,635	327,375	277,080	486,528

Source: BLM Las Cruces District Office Files, 1984.

Note: a/Sizes of ranches are as follows:
Small Cow-Calf Operation: 1-199 AUs, Average 97 AUs, 34 Operators
Medium Cow-Calf Operation: 200-499 AUs, Average 304 AUs, 13 Operators
Large Cow-Calf Operation: 500+ AUs, Average 1,079 AUs, 5 Operators
Medium Cow-Sheep Operation: 200-600 AUs, Average 520 AUs, 8 Operators
See Appendix I-1 for additional information on individual ranch budgets.

It should be noted that although each individual ranch has its own characteristics and may vary significantly from other ranches, it is felt that the "typical" ranches used in this analysis adequately represent the majority of ranches in their appropriate category.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter provides the scientific and analytic basis for the selection of the preferred alternative. It discusses the significant impacts that are anticipated to result from implementation of each of the alternatives. Both the beneficial and adverse impacts affecting the environmental components, as discussed in Chapter 3, will be documented. Only significant impacts are discussed; therefore, if the analysis determined that impacts would not occur or would be insignificant, those impacts are not discussed. None of the alternatives would have significant impacts on climate, topography, air quality, paleontology, or fire.

The cause of an impact is tied to a component of the alternatives as identified in Chapter 2. The effect of the impact is tied to a component of the environment described in Chapter 3. The impacts discussed in this chapter were assessed on the basis of the description of the alternatives presented in Chapter 2. This assessment took into account the mitigation measures and standard stipulations described in Chapter 2, Management Guidance Common to All Alternatives. Because of those design features included to minimize environmental impacts, the impacts assessed in this chapter are considered to be unavoidable.

Knowledge of the area and professional judgment, based on observation and analysis of similar conditions and responses in similar areas, have been used to infer environmental impacts where data are limited.

The analysis of alternatives is based on the following assumptions:

1. Near-normal annual precipitation.

2. 10-year implementation.

3. Funds and personnel would be available for implementation.

4. Impacts would be monitored and implementation adjusted as necessary.

5. Minor adjustments in management actions may occur.

6. Short-term refers to 10 years (1996); long-term refers to 20 years (2006) and beyond.

7. Water would be available at reasonable depths and water rights would be granted.

8. Baseline data are accurate.

9. Environmental assessments would be completed before starting construction of any project.

10. Additional forage use by livestock would be authorized only if additional forage is permanently available.

11. Average width of new roads will be 20 feet. Maintenance will be of the amount necessary to ensure use. Standards will be in accordance with BLM Manual Section 9113.

12. Because information concerning actual livestock use has not been collected, an exact amount is not known. Estimates by BLM specialists are that actual use is approximately equal to the 5-year average licensed use (1979-1983), although a few operations may vary.

13. Herbicides for brush control would be those which have been approved for use by the appropriate Federal and State agencies so that no program delay would occur.

There was no detailed study as to which alternative would be the most efficient in conserving energy, and only general observations are possible. Although all alternatives would require the expenditure of energy, the Production Alternative would require the most, followed by the Balanced, Protection, No Action, and No Livestock Grazing Alternatives. Energy use for the alternatives will not be evaluated further because of the lack of reliable information. The cost effectiveness (including energy use) of discrete actions would be analyzed in environmental assessments prepared before such actions are implemented.

IMPACTS OF ALTERNATIVES

Alternative I -- Balanced

Access

By constructing new roads or acquiring easements across non-Federal existing roads, access to public land would be guaranteed, resulting in fewer user complaints (of lack of access to public land) and an increase in the efficiency of managing public land.

Lands

The loss of 45,000 acres from BLM management would have a significant short-term impact on the lands resource as these lands would no longer be available for BLM management, but would be available to meet private, city, county, and State needs. Since it would affect only about 2.5 percent of the total BLM acreage currently being managed, the long-term effect would be negligible.

Geology and Minerals

Barring market fluctuations, the short- and long-term impacts to mineral exploration and development would be basically the same under this alternative, and would result from three major actions: (a) the designation of Special Management Areas as limited or closed to off-road vehicle (ORV) travel, restricted to limited surface disturbance, or designated as No Surface Occupancy (NSO); (b) the transfer of mineral or associated surface estate from BLM to private or other jurisdiction; and (c) the development or acquisition of access. The first action is the only one anticipated to have any impact on minerals.

The designation of areas as limited to ORV use, closed to ORV use, limited surface disturbance, and NSO could have a significant impact on mineral exploration and development, primarily because the proposed locations of many of these designations are in areas of moderate to high mineral potential. The following areas are of particular concern.

Three Rivers Watershed Treatment Area (21,446 acres)

This area coincides with the Southern Sierra Blanca coal field. Limitation of ORV use in the area could inhibit exploration and development.

Percha Creek Riparian Area (320 acres)

Located within the Hillsboro mining district, this area has produced gold, silver, and copper. Fencing of this area would effectively prohibit mineral development and production and greatly inhibit mineral exploration. Additionally, BLM mining claim records dated September 17, 1984, show numerous mining claims located in this area.

Cornudas Mountains (15,490 acres)

This area is known to contain rare earth minerals, including beryllium. The limitation of ORV travel could inhibit mineral exploration, particularly because the designation covers such an extensive area. Additionally, BLM mining claim records dated September 17, 1984, show numerous mining claims located in parts of this area.

Alamo Mountain (200 acres)

This area contains high-quality limestone. The NSO designation and closure to ORV travel would prohibit mineral exploration.

Jarilla Mountains (120 acres)

Gold, copper, iron, and other locatable minerals have been produced from this vicinity. Closing the area to ORV travel could inhibit future mineral exploration. Additionally, BLM mining claim records dated September 17, 1984, show numerous mining claims located in this area.

Butterfield Trail (2,220 acres)

Limitation of surface disturbance in this area, parts of which contain beryllium and other rare earth minerals, would inhibit mineral exploration and development.

Jornada del Muerto Trail (1,252 acres)

The northern part of the area proposed under this alternative lies within the Engle coal field. Limitation of surface disturbance would inhibit mineral exploration and development.

Of less concern is the designation of Lone Butte and the Tularosa watershed area as limited to ORV travel. Although Lone Butte is a possible source of aggregate for road construction, the relatively small size of this limitation would cause the overall effect to be insignificant. The proposed limited ORV designation on the Tularosa watershed does overlap with some areas of sand and gravel potential; however, the impacts to these resources would be insignificant because of the availability of other nearby deposits.

Any impacts resulting from the designation of 42 40-acre study plot exclosures would be insignificant due to the small size of the individual exclosures, unless located within a known mining area. The removal of interim ORV limitations presently in existence for McGregor Range would have no effect on mineral exploration or development unless the lands were also opened to mineral entry.

The land tenure adjustment issue as proposed under this alternative could result in the loss of up to 45,000 acres of mineral or associated surface estate from Federal management. The loss of revenue from leasable and saleable minerals would be insignificant and other impacts to mineral exploration and development would be determined in site-specific mineral reports. (See Chapter 2, Management Guidance Common to All Alternatives.)

As mentioned previously, increased accessibility of public land could have a favorable impact on mineral exploration and development. The overall impact, however, would be insignificant.

Soils

Under the Balanced Alternative, Category I allotments would be managed to increase livestock forage use to 181,864 animal unit months (AUMs) in the long-term; 46,603 AUMs above the current 5-year average of 135,261 AUMs. Construction and installation of new rangeland developments would disturb soils on approximately 194 acres in the short-term. In the long-term, 40 acres of soils would be lost from production of native vegetation. Medium and fine textured soils would be compacted around water facilities, cattle trails, and other areas where livestock concentrate. Compacted soils lower the infiltration rate of water, causing higher rates of runoff from these areas. Gullies and increased soil loss result when runoff water collects in cattle trails and flows down slopes. Soil loss by

sheet erosion would increase slightly in areas where vegetation production and ground cover is decreased because of higher runoff from these areas. In areas of accelerated erosion, minor soil losses would be irretrievable. Long-term changes in erosion rates would be dependent on other factors (climate, nonvegetation ground cover, soil moisture, etc.) and would not be significant to the total erosion condition of the entire White Sands Resource Area (WSRA).

An estimated 58,742 acres would be chemically treated for brush control. Herbicides used for brush control usually are soil-applied (for uptake by roots), or foliar-applied (taken in through leaves). When applied, the herbicides infiltrate and are leached into the soil profile with rainwater. Studies have shown that most herbicides are adsorbed by soil particles and held in the upper part of the soil profile (Bovey et al. 1982; O'Connor et al. 1980). The herbicides would not leach farther than maximum infiltration of precipitation into the soil, thus would not contaminate underground water tables when applied using standard operating procedures. (See Appendix C-3.)

Once in the soil, the primary factors affecting the length of residual activity of the herbicides are microbial decomposition, chemical decomposition, and adsorption on soil colloids. There are no documented cases of herbicides, at normal rates under field conditions, significantly reducing microbial growth. On the contrary, detoxification of herbicides by microorganisms is a method of regulating persistence of many herbicides in the soil (Scifres 1980). Foliage-applied phenoxy herbicides are highly susceptible to microbial decomposition and are unlikely to persist into the succeeding year even at extremely high rates (Upchurch 1966). Other foliage-applied herbicides, such as Triclopyr, Dicamba, and Picloram, would be expected to also be susceptible to rapid microbial decomposition.

Soil applied herbicides such as Tebuthiuron are formulated to be leached into the soil, taken up by the roots, and are not decomposed as readily by soil microbes. Residues of Tebuthiuron persist in soils and are effective for 2 years or more following application (Bovey et al. 1982), depending on rates of application and soil types. Studies show a half-life of 27 days for Dowco 290, although further studies are needed to elucidate degradation and soil leaching characteristics under different soil conditions (Dow Chemical Company n.d.).

Soil erosion by wind and water would increase slightly in the short-term on the 58,742 acres which are chemically treated and 2,381 acres to be burned due to the decreased ground cover following treatments. In the long-term, wind and water erosion would decrease where ground cover is improved following the treatments. The changes in erosion rates would be confined to spray plots or pastures and would not be significant to the entire WSRA.

Under the Balanced Alternative, 62,586 acres would be considered for watershed treatments. The treatments would improve erosion condition of the watersheds by eliminating further headcutting, improving soil stability, increasing vegetation ground cover, and decreasing soil loss. Common watershed rehabilitation practices include gully plugs and rock check dams

for stabilizing headcuts, wire checks, spreader dikes for more efficient use of runoff water, and reseeding for improved vegetation ground cover. The improved condition would be confined to small areas and thus would not be significant to the total erosion condition of the WSRA.

Except for the 85,736 acres designated for special management, all public land would be open to ORV use. Medium and fine textured soils would be susceptible to compaction by ORVs, especially when wet. ORVs form ruts on wet soils and destroy vegetation, leaving these areas susceptible to the formation of gullies. Gravelly and cobbly soils typical of hilly terrain also become susceptible to accelerated erosion if soil structure is altered by vehicles' tires spinning and loosening soils when travelling up hills. New State laws currently regulate hunters driving off-road, which eliminates some of the impacts which have occurred in previous fall hunting seasons when hunters concentrate in certain areas of the Resource Area. Recreational ORV activity would continue around populated areas, causing long-term irretrievable loss of soils, but the increases in erosion rates resulting from ORVs would be insignificant in the Resource Area.

Approximately 576 acres of soils would be disturbed and lost from production of native vegetation during construction of approximately 238 miles of roads under the Balanced Alternative in the long-term.

Water Resources

Under the Balanced Alternative, rangeland management on Category I allotments is proposed to achieve increased forage production, and would result in an increase in vegetation cover. Vegetation treatment would consist of chemical application on 58,742 acres and controlled burning on 2,381 acres. Peak runoff rates would increase slightly on the treated areas for 2 to 3 years following the treatments. In the long-term, runoff rates would decrease an average of 15 percent on key range sites. (See Appendix B-1 for more detail.) This reduction in runoff would improve on-site utilization of water and lower amounts of suspended sediments and dissolved solids transported by runoff water.

Herbicide application for control of mesquite and creosotebush would present a potential for polluting water resources. Mobility and degradation rate of herbicides in an ecosystem are important factors when considering water contamination. Herbicides could enter surface water indirectly through subsurface and overland flow, and through direct application or drift.

Entry to surface water via subsurface flow would not be significant. Leaching does not appear to be an important process for transporting quantities of herbicides based in part on the low availability of residues, and on the low significance of subsurface flow in arid

conditions where ephemeral stream systems dominate with low rainfall and a high evaporation rate. Surface water contamination from herbicide application via overland flow would also be minimal. Application procedures that follow the guidelines for vegetation treatments (see Appendix C-3) would reduce the chance of accidental spills and possible water contamination. Peak concentrations of herbicides would vary according to length of time between application and first rain, but would be low because application would not coincide with major runoff events. Short-term concentrations would be localized because treatment areas are within closed basins and drained by ephemeral stream systems.

Surface water contamination would be minimal due in part to stipulations that call for buffer strips and carefully controlled application near surface water impoundments. No treatments are planned near perennial streams, floodplains, or riparian areas; therefore, State water quality standards would not be exceeded as a result of chemical brush control.

Contamination of ground water resources from herbicide application is associated with their leachability in the soil profile. As stated earlier, leaching does not appear to be an important process for transporting significant quantities of herbicides. In several studies (Bovey et al., 1975 and 1978; Bovey and Scifres 1971), where ground water was sampled following treatments with 2,4,5-T and Picloram, very low concentrations or no detection were found in local seeps and shallow wells from the treated area. Further studies are needed to determine soil leaching characteristics of Dowco 290 under different field conditions (Dow Chemical n.d.). Depth to water in the proposed vegetation treatment areas varies from 50 feet to over 200 feet. The main potential for ground water contamination would be in shallow wells (less than 100 feet) drilled in the alluvial deposits on piedmont slopes, and in the channel deposits of major arroyos, where significant recharge occurs locally. These situations would be limited in the proposed treatment areas and buffer strips would effectively reduce impacts to water quality where these conditions did exist. The possibility of herbicide contamination of ground water supplies in significant amounts would be remote because of their relatively slow rate of movement in soil and rapid biological and photo detoxification. Stipulations would control application near major recharge areas.

Consumptive water use by livestock and big game would be 174 acre-feet per year in the short-term and 224 acre-feet per year in the long-term. This would be a 26 percent increase in water presently consumed. Total water depletion in the long-term, including earthen stock tank evaporation, would be 450 acre-feet per year, and would be an irretrievable loss of the resource. There would be no change in water use by the wild burro herd.

Watershed improvements that would include both structural and land treatment measures would address the problems of flood and sediment damages. The primary objectives of watershed treatments would include a reduction in peak runoff rates, a reduction in sediment yield, improved water quality, and better on-site utilization of runoff water, which would

significantly improve the areas in the long-term. Future management plans would be tailored to meet these objectives on 62,586 acres of rangeland.

ORV use would be limited to existing roads and trails on 62,586 acres of rangeland as part of future watershed plans. This action would help to improve vegetation cover in the long-term, and slightly reduce peak runoff rates and sediment yield on the 62,586 acres receiving the watershed treatments.

The riparian area along Percha Creek would be fenced to eliminate ORV and livestock use. This action would slightly improve channel stability in the long-term along the protected portion of the stream.

New roads proposed under the Balanced Alternative would be constructed with stipulations to minimize drainage erosion problems. In the short-term, slight increases in sediment yield would be expected. The degree of this impact would vary with the length and specific site area.

Vegetation

Under the Balanced Alternative, small amounts of vegetation would be disturbed or destroyed at the sites of the proposed rangeland developments. Acres of vegetation disturbed or destroyed by rangeland developments are shown in Appendix D-5. Vegetation would be impacted on 194 acres in the short-term and 40 acres in the long-term. The amount of vegetation disturbed during construction would depend on the methods used (e.g., flexible pipe used on pipelines ripped in would cause less disturbance than trenching used in rigid pipe placement). Livestock grazing pressure would increase around proposed new waters and in a few instances, adjacent to new fences. Impacts resulting from the additional use would be offset by decreased pressure around existing waters and improved livestock distribution.

Under the Balanced Alternative, forage consumption in the short-term could decrease if monitoring studies indicate a need for a downward adjustment in livestock numbers. Monitoring studies would help determine a proper balance between forage produced and utilized on each allotment. Proper use for each species and relative species abundance also would be analyzed. These monitoring studies would indicate where adjustments would be needed to arrive at a stocking rate consistent with improving the vegetation resource. Most livestock grazing studies in the Southwest show a need for a change in management, along with proper stocking rates, in order to obtain effective results in rangeland improvement (Cable and Martin 1964; Paulsen and Ares 1962; Canfield 1939). Specialized grazing systems have increased herbage production an average of 13 percent over continuous grazing while reductions in livestock utilization from heavy (60 to 80 percent) to moderate (40 to 60 percent) have increased production 35 percent (VanPoollen and Lacey 1979).

The long-term impact under this alternative would be an increase in production and cover of desirable and intermediate forage species preferred by grazing animals. Proper management, which provides for rest

during critical periods of plant growth, could lead to an increase in plant species numbers. Reduced grazing pressure would increase plant vigor, leading to increased seed production and revegetation by seedlings, rhizomes, and stolons. If these desirable and intermediate plants are the climax species, they would out-compete the lower value species and reinvade the site (Stoddart et al. 1975).

The analysis of data from the vegetation inventory indicates that the poor or fair ecological condition classes are not relative to total production from all species, percent vegetation ground cover, or litter. However, these data do indicate a larger percentage of desirable and intermediate forage species in the higher condition class.

Permitted livestock grazing use would be based on utilization patterns and trend studies, which are part of the monitoring procedure on Category I allotments. Adjustments needed to bring stocking rates in line with grazing capacities would reduce pressure on desirable and intermediate forage species on overstocked allotments. Plant reproduction and vigor would increase as a result of reduced stocking rates and rest from livestock grazing during certain critical periods. Ground cover and forage species production would also increase from these changes.

Under the Balanced Alternative, short-term changes in each ecological condition class by range site would not be significant. Long-term changes would occur in each ecological condition class by range site as a result of grazing management treatments, rangeland developments, and 58,742 acres of vegetation treatments. (See Table 4-1 for a summary of total projected public land acres by ecological condition and forage value class by alternatives and Table 4-2 for these changes by range site under the Balanced Alternative.) Ecological condition class ratings would be expected to increase by 10 points on allotments under the Category I management scheme except for those areas where the existing rating is 0-10, indicating there is very little potential for improvement. Forage value class would change proportionately. Projections for changes in the number of acres in ecological condition or forage value class are based on the amount of potential for improvement that each individual site write-up area (SWA) possesses. (See Appendix C-8 for methodology.) In the long-term, desirable and intermediate grass and forb species would compete with undesirable species, increasing composition and ground cover. Vegetation production in 1982 was very low (see Table 3-3); as a result, analyses were not done on vegetation production.

Under this alternative, 53,118 acres of creosotebush and 5,624 acres of mixed desert shrub would be treated with chemical herbicides to reduce the competition for available moisture. These treatments would raise the existing ecological condition one class in the long-term after treatment. Range sites proposed for treatment are gyp upland (SD-3), deep sand, gravelly (SD-3), shallow, shallow sandy, limy, loamy (SD-3), and bottomland.

TABLE 4-1
SUMMARY OF TOTAL PROJECTED PUBLIC LAND ACRES CHANGES
BY ECOLOGICAL CONDITION AND FORAGE VALUE CLASS BY ALTERNATIVES[a/]

	Acres by Alternative					
	Present	Balanced	Production	Protection	No Action	No Livestock Grazing
Ecological Condition						
Excellent	-0-	17,900	28,707	8,950	-0-	-0-
Good	138,216	227,063	295,227	337,781	69,746	448,499
Fair	386,596	470,653	481,643	403,876	433,242	337,099
Poor	413,005	222,201	132,240	187,210	434,829	152,219
Forage Value						
Good	422,239	535,922	565,406	572,546	328,414	609,214
Fair	252,401	215,180	272,138	200,528	335,345	185,831
Poor	263,177	186,715	100,273	164,743	274,058	142,772

Source: BLM Las Cruces District Inventory Data, 1982-1983.

Note: a/Acres reflect only the areas transected during the 1982-1983 inventory.

Five herbicides are proposed for use in controlling creosotebush and mesquite. Impacts of these treatments under the Balanced Alternative are Resource Area-wide. Chemically treated acres discussed under the Balanced Alternative are for Otero County and parts of Lincoln, Eddy, and Chaves Counties. Tebuthiuron (Graslan) is a pelletized herbicide used on both creosotebush and mesquite. Picloram, Dicamba, Triclopyr, and Dowco 290 are foliar herbicides used on woody species and broadleaf weeds. Appendix C-3 contains guidelines for use and restrictions of applications for the herbicides except for Dowco 290, which is not labeled at the present time. Technical Report III contains additional information on some of the herbicides mentioned.

Short-term impacts would occur within 1 to 3 years following application of chemicals. Pelletized treatments would be a gradual kill over this 3-year period. Foliar spray effects would be more immediate, usually killing plants by the second year. The average percent kill with chemical treatments would be 40-60 percent when used as recommended. Foliar sprays are absorbed from leaf surfaces or cuticles and transported to actively growing plant parts. Herbicide movement is favored by good soil moisture and growing conditions. Granular herbicides are leached into the soil to the plant's rooting zone following rainfall and are absorbed by the plant's root system.

TABLE 4-2
PROJECTED PUBLIC LAND ACRES BY RANGE SITE
FOR EACH ECOLOGICAL CONDITION AND FORAGE VALUE CLASS[a/]

Alternative I -- Balanced

Range Site	Ecological Condition (acres)				Forage Value (acres)		
	Excellent	Good	Fair	Poor	Good	Fair	Poor
Southern Desert MLRA 42							
Gravelly							
SD-2			8,847			2,987	5,860
SD-3	10,647	16,135	29,411	22,069	23,917	32,310	22,035
Deep Sand			192	49,146	192	7,890	41,256
Sandy							
SD-2			9,013	14,975	9,013		14,975
SD-3			4,868	2,159	591	4,868	1,568
Gyp Hills		977	585	12,991	977	11,041	2,535
Loamy							
SD-2			10,021	10,356	15,142	703	4,532
SD-3		51,812	44,978	43,359	55,797	43,743	40,609
Bottomland							
SD-2			820			105	715
SD-3			247	6,145		4,419	1,973
Limestone Hills							
SD-2		21	4,337	5,373	624	8,155	952
SD-3		100,662	78,752	2,974	136,707	42,703	2,978
Igneous Hills and Mountains		12,495	2,319	2,027	14,814		2,027
Salt Flats			1,830	6,268			8,098
Shallow Sandy	2,929	9,651	98,949		111,529		
Gyp Upland	1,413	1,742	37,702	22,942	47,077	5,355	11,367
Draw				412		412	
Shallow	2,911	14,997	25,742	4,076	18,077	25,573	4,076
Limy		962	4,682	1,199	3,974	1,670	1,199
Pseudoriparian[b/]		45			45		
Badlands[b/]			10,404	3,305	2,202	2,290	9,217
Subtotal	17,900	209,499	373,699	209,776	440,678	194,224	175,972
Canadian-Pecos Plains MLRA 70							
Limestone Hills		6,930	89,764		78,217	18,477	
Shallow			83	1,155	83		1,155
Loamy		1,104	1,437	5,267	2,466	75	5,267
Swale		74	1,098		1,172		
Gravelly			802	6,003	2,484		4,321
Shallow Loamy		9,456	3,770		10,822	2,404	
Subtotal		17,564	96,954	12,425	95,244	20,956	10,743
TOTAL	17,900	227,063	470,653	222,201	535,922	215,180	186,715

Source: BLM Las Cruces District Inventory Data, 1982-1983.

Notes: a/Acres reflect only the areas transected during the 1982-1983 inventory.
b/Not a Soil Conservation Service range site; developed by BLM Las Cruces District for this document.

Tebuthiuron would be used primarily on creosotebush, where it has proven effective at low rates of application. Higher rates of application would be effective on mesquite. Forb and grass growth can be reduced or damaged by Tebuthiuron when it is applied during active growth at greater than 3/4 pounds active ingredient per acre (AI/Ac) (Baur 1978). Tebuthiuron's photosensitivity breakdown time is being further studied so granules can be applied during any season.

Dicamba is a herbicide effective for broadleaf weed and brush control. Mesquite can be substantially reduced or killed by using Dicamba (Bovey 1977). Creosotebush is also susceptible to both a foliar spray and soil treatment of Dicamba. Dicamba may be used in the form of granules for ground application (5 percent active ingredient per granule), or a water soluble liquid for aerial spraying.

Dicamba would be toxic to actively growing forbs. Those forbs that initiate growth while Dicamba is still present would also be defoliated or killed (Bovey 1977). Forb production would increase after the herbicide had dissipated. Nontarget brush species such as tarbush would be defoliated (Bovey 1977) along with the target species (creosotebush and mesquite). Residues of Dicamba, either sprays or granular, would not persist in vegetation longer than 1 year after treatment, because it is susceptible to thermal degradation (Baur et al. 1974; Scifres and Allen 1973). Dicamba is resistant to photodecomposition, and would persist longer than 2,4,5-T (Baur et al., 1974).

Picloram is a herbicide effective on some annual and perennial weeds. In a short-grass vegetation type in Arizona, Picloram produced a 95 to 100 percent kill of snakeweed (Little and Schmutz 1970). Past studies show Picloram to be intermediately effective in controlling creosotebush (Schmutz 1967). Foliar sprays of Picloram are effective in controlling mesquite (Bovey and Mayeux 1980), whereas soil applied pellets are ineffective (Meyer 1982; Kitchen et al. 1980). Picloram may be used in the form of a water miscible liquid, pellets, or granules (10 percent active ingredient per granule).

Picloram use would prevent germination of grasses and would defoliate nontarget shrubs in the treatment area, such as acacia. Other shrubs, such as pricklypear and sumac, would be reduced or killed (Bovey 1977). Picloram would be more persistent in vegetation than Dicamba because it is resistant to microbial degradation in the soil (Scifres and Allen 1973).

Triclopyr is an herbicide effective in controlling broadleaf weeds and woody plants. For the best results, applications should be made when woody plants and weeds are actively growing. When hard to control species are prevalent and during applications made in late summer when the plants are mature or during drought conditions, higher rates should be used. On sites where easy to control brush species dominate, rates less than those recommended may be effective.

The control of herbaceous plants is increased with ammonium salts (Picloram), benzoic acids (Dicamba), and substituted ureas (Tebuthiuron) (Sosebee and Dahl 1979). Brock et al. (1970) found that neither Dicamba nor Picloram sprayed at 0.5 pounds AI/Ac reduced grass seedlings. Rates of 1 pound AI/Ac reduced the number of grass seedlings, but not significantly. All herbicide rates of either Dicamba or Picloram substantially reduced forb production (Sosebee and Dahl 1979).

Dowco 290 induces auxin-type responses in growing plants. When used in combination with phenoxy herbicides, it has proved to be very effective in controlling phenoxy-tolerant weeds. This herbicide does not usually affect grasses.

Herbicide tolerance by grasses generally increases with stages of plant growth, but grasses differentially respond to the type and rate of herbicide used (Halifax and Scifres 1972; Scifres and Halifax 1972). Half shrubs and woody plants are more susceptible to herbicides than grasses. Picloram (0.25 to 2.0 pounds AI/Ac) was the most effective liquid herbicide used to control Chihuahuan desert shrubs, whereas phenoxy herbicides were less effective (Sosebee and Dahl 1979). Forb growth would probably begin increasing during the third growing season. The reduction of forbs as part of the useable forage for livestock would have a minor effect due to the two growing season deferment after treatment.

As the competition for available moisture is reduced, forage species would increase. This increase of additional forage would be three or four times what was previously available.

Martin (1966) found on pastures where mesquite was sprayed, the estimated number of animal units (AUs) to graze 40 percent of the perennial grass crop increased by 169 percent between 1954 and 1961. Cable and Martin (1964) show a perennial grass production increase on mesquite sprayed areas from 220 pounds to 443 pounds per acre. The Jornada Experimental Range Annual Research Progress Report (CY 1979-USDA 1980) indicates a three to eight time production increase of perennial grasses on sprayed areas as opposed to untreated areas in a 3-year period. Stocking rates increased three to four times.

Although good rangeland management practices would prolong the benefits of brush control, retreatment could be needed in 15 to 20 years if brush species started to reinvade the site (National Research Council 1968; Herbel 1982).

The number of acres in each ecological condition would increase in excellent from 0 to 17,900; good from 138,216 to 227,063; and fair from 386,596 to 470,653. The number of acres in poor ecological condition would decrease from 413,005 to 222,201. The number of acres in the good forage value class would increase from 422,239 to 535,922 and decrease in fair from 252,401 to 215,180 and poor from 263,177 to 186,715. Acres in ecological condition and forage value classes would change due to proposed vegetation treatments, grazing management treatments, and rangeland developments. (See Table 4-1 for a summary of total projected public land acre changes by

alternative and Table 4-2 for these changes by range site under the Balanced Alternative.)

Desirable and intermediate forage species production would increase three to four times on chemically-treated areas. Vegetation ground cover would also increase in the long-term.

There would be a 40-acre study plot exclosure designated for each of the 41 range sites and one pseudoriparian Standard Habitat Site (SHS). Protection of these sites from livestock grazing and surface disturbing activities would provide an undisturbed area that would be useful in establishing trends in vegetation change and provide baseline data that would improve understanding of the ecology of each site (1,680 acres).

The protection of Lake Holloman and adjacent lands in addition to the riparian area along Percha Creek would provide protection of vegetation on 1,480 acres.

Under land tenure adjustment, vegetation on 45,000 acres would be lost from BLM jurisdiction within the Resource Area.

In the process of providing legal access to public land within the Resource Area, vegetation on 576 acres would be lost in the construction of new roads.

Threatened or Endangered Plant Species

Most of the threatened or endangered plant species are located in areas where livestock grazing is limited due to rocky or mountain slopes. Many are unpalatable and would seldom be grazed. These plants could be damaged from trampling or from livestock grazing the associated species. The reduction in livestock numbers under the Balanced Alternative would cause less disturbance to the habitat and reduce livestock grazing on associated plant species in the short-term. However, in the long-term, livestock numbers would increase. Areas where threatened or endangered plant species occur would be identified and avoided where adverse impacts would occur from vegetation treatments and rangeland developments.

Livestock Grazing

Under the Balanced Alternative, 106 allotments would be grazed and 4,337 acres would remain unallotted.

There are 67 allotments in Category I covering 870,163 acres or 91 percent of the public land in Otero County and parts of Lincoln, Eddy, and Chaves Counties. Allotments in Category I are shown in Appendix D-1.

Rangeland management in areas with resource conflicts (riparian areas, ACECs, known herd units, and areas where threatened or endangered species may occur) could be significantly impacted depending on the management scheme chosen. Production practices, types of operations, periods of use, and class of livestock could all be affected. In the

short-term, livestock grazing use could be adjusted based on utilization studies and actual grazing use. For analysis purposes, livestock grazing would be reduced 35 percent on acres in poor ecological condition and 20 percent on acres in fair ecological condition. Using the worst-case situation, initial adjustments on Category I allotments would be 21 percent or 29,285 AUMs below preference to 118,631 AUMs. These AUMs would be held in suspended preference.

Yearlong grazing, a common method of livestock management in the semiarid desert rangeland region, would continue in the short-term. Semiarid rangelands traditionally have been grazed yearlong and research shows that these rangelands can be grazed at any time of year without serious detriment if the intensity of grazing is not severe and periods of grazing alternate with suitable periods of rest. The primary shortcomings of continuous yearlong grazing is that it leads to excessive use in areas of cattle concentration and wasted forage where cattle rarely graze. Favorite plants and areas of a pasture are regrazed first each summer, thereby keeping them in a state of lower condition (Martin 1975 and 1978). Systems such as rest during alternate years do not provide enough recovery time for grasses to regain vigor, seed, and establish new seedlings (Arizona Interagency Range Committee 1973 [1974]). Possible grazing management treatments that could be used on these Category I allotments are found in the Agricultural Experiment Station Research Report 467, Characteristics of Grazing Systems (Gray et al. 1982).

Chemical treatment of creosotebush and mixed desert shrub would occur on 58,742 acres of public land. In the short-term, there would be a 6,017 AUM increase on 18 allotments in Otero County and parts of Lincoln, Eddy, and Chaves Counties after treatment. Allotments with acres of vegetation treatment and increased AUMs are shown in Appendix C-1. Livestock grazing on these treated areas would be excluded for a minimum of two growing seasons to give perennial forage a chance to reestablish. In the long-term, the increased forage production on these allotments would offset reduced grazing use during the deferment. With improved ecological condition and increased perennial forage, ground cover would also increase.

Monitoring studies, including rangeland condition and trend, utilization patterns, actual use, and precipitation records would be used to evaluate and make adjustments in livestock numbers. Adjustments in livestock use would be based on forage production and upward or downward trends in rangeland condition. Permittees would be involved in all aspects of developing grazing management plans.

In the long-term, projected livestock AUMs would increase 22 percent or 30,455 AUMs above preference on Category I allotments. Proposed rangeland developments would be implemented first on these Category I allotments on a priority basis. (See Appendix D-5.) New rangeland developments would redistribute grazing use and relieve grazing pressure around existing developments in the short-term. Presently severe or heavily used areas would show improvement in the long-term.

There are 30 allotments in Category M covering 71,728 acres or 8 percent of the public land in Otero County and parts of Lincoln, Eddy, and Chaves Counties. Allotments in Category M are shown in Appendix D-1. No change in management would be proposed on these allotments since they are in satisfactory or better ecological condition. Forage production could increase, but probably not enough in the long-term to warrant increased livestock numbers. The 5-year average license use was used for the short- and long-term AUM projections. Rangeland developments could be implemented dependent upon funding and priorities on the Category M allotments. (See Appendix D-5.) Impacts from the proposed rangeland developments would be the same as discussed under the Category I allotments.

Nine allotments in Category C cover 7,776 acres or 1 percent of the public land in Otero County and parts of Lincoln, Eddy, and Chaves Counties. Allotments in Category C are shown in Appendix D-1. No change in management would be proposed on these allotments. The 5-year average licensed use was used for the short- and long-term AUM projections since management objectives or goals are not proposed. Proposed rangeland developments could be implemented dependent upon funding and priorities on the Category C allotments. (See Appendix D-5.) Impacts from the proposed rangeland developments would be the same as discussed under the Category I allotments.

Category M and C allotments would maintain their present 5-year average licensed use of 9,183 AUMs in the short- and long-term. However, these allotments could be grazed to preference (10,182 AUMs).

Criteria for categorizing allotments are shown in Appendix D-3. Five-year average licensed use and preference by allotment for all allotments are listed in Appendix D-8. Acres in each ecological condition class by allotment used in categorizing I, M, and C allotments are shown in Appendix D-4. Appendix D-9 shows carrying capacity and management status by allotment under the Balanced Alternative.

Overall projections on all allotments show a short-term reduction in livestock AUMs of 31,837 or 22 percent below the grazing preference. These AUMs would be held in suspended preference and could be restored, depending on improvement changes in the vegetation resource as a result of rangeland developments and vegetation treatments. In the long-term, 181,864 AUMs would be available for livestock use. This would be an increase of 33,948 AUMs or 23 percent above preference.

There would be a 40-acre study plot exclosure designated for each of the 41 range sites and one pseudoriparian SHS. Protection of these sites from livestock grazing and surface disturbing activities would provide an undisturbed area that would be useful in establishing trends in vegetation change and provide baseline data that would improve understanding of the ecology of each site. Grazing would be eliminated on 1,680 acres, totaling 246 AUMs.

The protection of Lake Holloman and adjacent lands in addition to the riparian area along Percha Creek would provide protection of vegetation and would eliminate livestock grazing on 1,480 acres, totaling 217 AUMs.

Under land tenure adjustment, approximately 45,000 acres would be lost from BLM jurisdiction and 6,598 AUMs would be removed from BLM authorization within the Resource Area. Grazing fees from the 6,598 AUMs of grazing use would no longer be received. Under this alternative, Section 3 allotments may not be affected while Section 15 allotments have the potential to be affected.

In the process of providing legal access to all public land within the Resource Area, an additional 84 AUMs would be lost in the construction of new roads.

Wild Burros

Under the Balanced Alternative, the wild burro herd would be managed at approximately 12 burros. Excess animals would be made available under the Adopt-A-Horse Program. Those animals remaining would have better habitat and less competition for forage.

Since fences currently are not a problem to burros and fence construction is not proposed for the area, there would be no significant impacts to the free-roaming nature of the wild burros in the short- or long-term.

There would be no significant impact in any area. All of the wild burro areas which were inhabited by wild burros in 1971 would continue to be managed as wild burro areas.

Wildlife

Standard Habitat Sites (SHS's)

The long-term improvement in ecological condition in Otero County would result in approximately 20 percent of the SHS acreage changing to the next higher ecological condition class. The actual changes in acres by SHS are shown in Table 4-3. The percentage change ranges from 29 percent for mesquite rolling upland and mixed shrub rolling upland to 1 percent for mesquite sand dune, and no change for creosote hill. The changes within each SHS would generally be a reduction of shrubs in the grass types and an increase in the more desirable browse species in the shrub types. There would be an increase in production of preferred browse species of approximately 12 percent. The inventory data indicate that the shrub vegetation types on the hill landform (creosote hill, for example) indicate that the shrub component would generally decrease in composition with improving ecological condition, resulting in a decrease in bird and plant diversities. This is probably due to the shift of the vegetation to a more grassland aspect. The grass mountain SHS also would lose diversity as the shrub component of the vegetation declines with an upward trend in ecological condition.

None of the ORV designations would have any short-term or long-term significant influence on any of the habitat types. If ORVs concentrate in pseudoriparian areas, there could be an insignificant increase in shrub destruction.

TABLE 4-3
COMPARISON OF ECOLOGICAL CONDITION DATA

Standard Habitat Sites	Total Acres	Acres Which Would[a] Change to: Excellent	Good	Fair	Plant Diversity Index Good	Fair	Poor	Percent Composition Preferred Browse Species (A and B) Good	Fair	Poor	Average Number of Plant Species Good	Fair	Poor	Mammal Diversity Index Good	Fair	Poor	Bird Diversity Index Good	Fair	Poor	Herptiles Diversity Index Good	Fair	Poor
Creosote Rolling Upland	246,067	14,578	13,091	32,495	1.26	1.62	1.06	2	1	1	10.5	10.2	6.51	1.06	1.75	1.22	1.69	2.30	1.89	ND	1.88	1.35
Creosote Hill	5,082	0	0	0	ND	ND	1.57	ND	ND	ND	ND	9.0	11.5	ND	ND	ND	ND	1.21	2.18	ND	ND	ND
Mixed Shrub Mountain	30,713	0	3,294	3,739	1.49	1.53	1.35	4	1	9	12.5	12.5	9.5	2.71	1.30	ND	2.43	1.02	0.63	2.12	0.83	0.87
Mixed Shrub Rolling Upland	80,631	766	10,222	12,028	1.49	1.49	1.22	27	2	ND	12.0	10.73	7.68	ND	1.51	1.35	ND	2.08	2.20	ND	1.89	1.52
Mixed Shrub Hill	170,816	72	30,094	159	1.78	1.95	1.95	4	4	12	13.4	12.3	13.4	1.93	1.64	0.76	1.67	2.06	2.41	1.07	1.92	1.92
Mesquite Rolling Upland	5,981	0	73	1,672	ND	0.92	0.08	18	ND	ND	ND	8.0	5.0	ND	ND	0.91	ND	2.25	1.97	ND	ND	ND
Mesquite Sand Dune	53,112	0	0	297	ND	ND	0.95	12	ND	ND	ND	ND	6.6	ND	ND	1.01	ND	ND	1.79	ND	ND	0.71
Grass Flat	64,126	0	11,917	272	0.82	0.67	0.77	1	ND	ND	7.33	4.25	4.92	1.72	2.07	0.94	2.05	1.47	1.34	ND	1.62	1.46
Grass Rolling Upland	135,717	2,447	9,150	4,802	1.13	1.21	0.73	1	1	1	8.0	9.64	4.43	ND	1.48	1.54	2.05	1.69	2.05	ND	1.22	ND
Grass Mountain	100,234	0	7,862	17,063	1.37	1.93	1.31	1	3	5	10.33	12.0	13.0	1.64	1.75	2.06	1.98	1.99	1.18	ND	1.95	1.18
Pinyon-Juniper Grass Mountain	18,182	0	514	4,138	ND	1.94	1.91	35	17	ND	7.0	16.6	15.33	2.20	1.98	ND	2.47	2.83	2.83	1.17	1.07	1.74
Pseudoriparian	7,879	+	+	+	1.87	1.89	1.53	14	18	14	11.4	13.42	10.38	ND	1.77	ND	ND	2.39	2.49	ND	ND	ND
Riparian	524	+	+	+	2.01	1.53	1.20	64	74	56	14.5	17.5	6.5	ND	ND	ND	3.04	2.60	2.94	ND	ND	ND
Grass Hill	22,745	37	2,627	2,706	ND	1.69	1.71	1	1	ND	ND	12.0	10.0	ND	1.77	ND	ND	1.75	ND	ND	ND	ND
Salt Flat	20,553	0	0	4,681	ND	0.76	0.76	30	5	ND	ND	5.0	13.7	ND	ND	ND	ND	0.77	1.41	ND	ND	2.49

Source: BLM Integrated Habitat Inventory Classification System Data, 1982.

Notes: a/The acreages listed are the summation of site write-up areas which would increase one condition class under the Balanced Alternative.
ND - No data for this condition class.
+ - Insignificant increase.

In the long-term, the proposal to protect 320 acres of riparian habitat along Percha Creek in Sierra County would impact deer and riparian habitat-associated species by improving the ecological condition of the area. An improving ecological condition should include reestablishment of cottonwoods and other tree species which are essential to numerous riparian-associated wildlife species. The fences around Percha Creek would be designed to permit free passage by big game species.

The elimination of livestock grazing at Lake Holloman as a high use area for waterfowl would protect the current use of the area by a highly diverse assemblage of waterfowl in the short-term and long-term.

The most important habitat sites, as evidenced by inventory data, are riparian and pseudoriparian. (See Tables 3-6 and 4-3.) Except for small isolated and unmanageable tracts, it is BLM policy to retain riparian habitats. The impact of land tenure adjustments in the other habitat sites would depend upon the subsequent use of the lands. At the worst, land tenure adjustment would account for a very significant long-term loss of 45,000 acres of various habitat sites, or approximately 2 percent of the total habitat area available.

In the long-term, construction of 238 miles of road would eliminate approximately 576 acres of various habitat sites. The impact of this action would be insignificant if the more important habitat sites which are available in small acreages are avoided.

Big Game

Population levels for deer and pronghorn are shown in Table 4-4 for the herd unit areas shown on Map 3-4. Under this alternative, there would be a significant long-term increase in demand for big game AUMs of 48 percent. As stated earlier, there would only be an increase in preferred browse species of 12 percent. It is unknown whether availability of browse is presently limiting big game populations. However, if browse is found to be limiting through monitoring, it is doubtful that optimum numbers could be realized through implementation of this alternative without further reductions in livestock numbers, as indicated in the assumptions.

The open designation for ORV use of areas not otherwise designated would have a very limited long-term effect on big game populations. ORV use would be moderate only in the vicinity of population centers, where the big game populations are already very low to nonexistent and very little preferred big game habitat is available.

Long-term management of riparian habitat along Percha Creek would provide about 320 acres of high quality deer habitat. Table 4-3 shows that the highest percentage of preferred browse species occurs in riparian habitats and that the percentage may increase with improving ecological condition.

Management of the Sacramento Escarpment (3,640 acres) would provide a long-term increased opportunity to reach optimum numbers of deer within the escarpment area, or an increase of about 60 deer.

TABLE 4-4
PROJECTED LONG-TERM POPULATIONS -- BIG GAME[a/]

	Present	By Alternative				
		Balanced Alternative I	Production Alternative II	Protection Alternative III	No Action Alternative IV	No Livestock Grazing Alternative V [b/]
Deer	5,955 (14,281 AUMs)	12,588 (30,234 AUMs)	5,955 (14,281 AUMs)	12,588 (30,234 AUMs)	5,955 (14,281 AUMs)	12,588 (30,234 AUMs)
Pronghorn	731 (1,247 AUMs)	1,666 (2,852 AUMs)	731 (1,247 AUMs)	1,666 (2,852 AUMs)	731 (1,247 AUMs)	1,666 (2,852 AUMs)

Sources: BLM Las Cruces District Office Files, 1981.
New Mexico Department of Game and Fish, 1984.

Notes: a/Present and optimum big game numbers and AUMs are shown by livestock grazing allotment in Appendix E-3.
b/Forage would be available to support some unknown number of animals above the optimum level.

About one-half of the 45,000 acres potentially involved in land tenure adjustment is outside big game herd units. Under the worst-case use of land, habitat would be lost for an estimated 158 deer in the long-term.

New access could cause short- and long-term increased disturbance to big game, especially if new roads are located in or adjacent to pseudoriparian habitats, where almost one-third of deer observations were made during the inventories.

Small Game

An apparent increase in plant diversity in habitat types favored by scaled quail would imply long-term improved conditions for scaled quail. Although the available data are inconclusive, habitat conditions would also apparently improve in the long-term in the habitat types favored by Gambel's quail. Based on the diversity indices in Table 4-3, the increase in quail numbers could be significant.

Limited and closed ORV designations, management of the Percha Creek area, designation of 40-acre study plots, and management of Lake Holloman would provide about 45,736 acres of small game habitat with a reduced level of disturbance which, in the long-term, should improve food and cover for all small game species occupying each site in an unknown amount.

Land tenure adjustments, on a worst-case basis, would represent a loss of 45,000 acres of habitat in the long-term.

Nongame

In general, those species of nongame associated with long-term lower ecological condition ratings would decline an unknown amount while those associated with higher ecological conditions would increase an unknown amount. There is no indication that the improvements in ecological condition would be sufficient to cause any species to disappear from any habitat site.

Nongame species would probably be significantly reduced in the intensive ORV use area south of Alamogordo. The SHS's in the area of potential designation are the most abundant, such as mesquite sand dunes, creosote rolling uplands, and mixed shrub hill. Intensive ORV use of an area can cause a loss of habitat situation, especially for subterranean species. However, the loss of habitat would be minor.

Land tenure adjustments, on a worst-case basis, would represent a significant loss of 45,000 acres of habitat in the long-term.

Waterfowl

The proposed earthen stock tanks would provide a small amount of additional habitat for waterfowl species in the long-term. Elimination of livestock grazing at Lake Holloman would protect nesting habitat for waterfowl.

Management of Lake Holloman would maintain a significant habitat area for waterfowl in south-central New Mexico. Most of the waterfowl species in the area have been recorded at Lake Holloman. Cole et al. (1981) found that coots, phalaropes, ruddy ducks, northern shovelers, and avocets were the most common species using Lake Holloman, and that waterfowl reproductive success appeared low at Lake Holloman. Improved shoreline vegetation should result in improved reproductive success.

Fisheries

The rangeland management program would provide some minor long-term impacts to fisheries resources through reductions in erosion and sediment yields, based on information in the Soils section.

Threatened or Endangered Fauna Species

None of the proposed rangeland improvements under this alternative would have any direct effect on threatened or endangered fauna species or their habitat, based on known locations and the locations of proposed rangeland improvements. In the long-term, the proposed vegetation treatments could improve habitat conditions for the aplomado falcon and McCown's longspur, two grassland species.

Under this alternative, a new road would be constructed which would be in the general vicinity of two peregrine falcon sightings, apparently involving transient falcons. Impacts of the road on transient falcons would be insignificant.

Recreation

New access associated with proposed rangeland improvements would result in a change of 9,000 acres from the semiprimitive nonmotorized (SPNM) class to the semiprimitive motorized (SPM) class. This would be a 3 percent reduction in the recreation opportunities associated with the SPNM class and a 1 percent increase in the recreation opportunities associated with the SPM class. The majority of this change would occur in southeastern Otero County. In the long-term, this would result in insignificantly improved recreation access in the affected areas and a slight potential for increased recreational use of the areas. This could increase slightly the interaction between recreational and nonrecreational users.

In the long-term, deer and pronghorn hunting opportunities would increase insignificantly with the projected increase in the big game populations.

The quality of the recreation opportunities available in the Sacramento Escarpment is heavily dependent on the area's natural and scenic values. The Sacramento Escarpment ACEC would contain 3,640 acres and would be managed as a Visual Resource Management (VRM) Class I. No new rights-of-way would be granted and a NSO stipulation would be placed on energy minerals leases. This management would substantially reduce long-term surface disturbance in the ACEC and provide protection for

existing natural and scenic values. This would indirectly protect the dispersed recreation opportunities within the ACEC.

The limited ORV designation for the Three Rivers Petroglyph Site would protect existing recreational opportunities in the area in the long-term. The open ORV designations are, in effect, a continuation of the existing situation and would result in continued availability of recreation opportunities to all users and groups. ORV use could increase insignificantly in the long-term.

Land tenure adjustments would affect recreation opportunities in a variety of ways. The land near Lake Valley contains jasper and calcite of collectable quality and quantity. The parcel in Beeman Canyon, part of the Sacramento Escarpment, also contains unique recreation opportunities dependent on the area's rugged and scenic topography. The lands within the disposal identified for a portion of Alamo Mountain contain deer hunting and hiking opportunities. Transfer of these lands into non-Federal ownership could significantly affect the availability of the recreation opportunities to the general public.

The 238 miles of new roads proposed under this alternative would have a significant effect on the Resource Area's recreation opportunities. Approximately 52,000 acres would change from the SPNM to the SPM classification. This would be a 16 percent reduction in the recreation opportunities associated with the SPNM class and a 3 percent increase in the recreation opportunities associated with the SPM class. The majority of this change would occur in southeastern Otero County. This would result in long-term improved access for all recreation activities and could result in increased recreational use and an increase in contact between recreational and nonrecreational users.

Visual Resources

Visual contrasts would occur from the structures and surface disturbance associated with the proposed rangeland developments, vegetation treatments, and additional roads.

Although rangeland developments would have a slight overall impact on the area's visual quality, individual projects would result in moderate long-term local impacts depending on locations and visibility of the developments.

Vegetation treatments would result in direct impacts to visual resources on 62,720 acres. The short-term impact of standing dead and dying brush would be significantly reduced in the long-term as grasses and forbs are reestablished.

The transfer of Beeman Canyon, part of the Sacramento Escarpment, into non-Federal ownership could affect the long-term visual quality of the area.

Wilderness

The pipeline and drinking trough within the Brokeoff Mountains WSA could cause nonimpairing long-term impacts to the local area's naturalness. The pipeline, drinking trough, earthen stock tank, and associated vehicular access within the former Little Dog Canyon WSA, part of the Guadalupe Escarpment, could cause impacts to the local area's naturalness and could foreclose future options to consider the area for a wilderness designation.

Cultural Resources

In the long-term, trampling in the area would increase. This would lead to a moderate increase in artifact breakage and movement over the present situation. The following rangeland improvements would impact known cultural resources or probable areas of high site density.

1. Brush control projects north and west of Alamo Mountain would affect the Butterfield Trail and the Alamo Mountain petroglyphs.

2. Brush control projects in Salt Basin are in a probable high site density area.

3. The brush control project in T. 26 S., R. 14 and 15 E., may affect the Butterfield Trail.

4. The fence south of Lone Butte and the drinking trough south of Twin Buttes are in high site density areas.

The brush control projects would alter the vegetation composition in the long-term along the Butterfield Trail and make the Trail harder to trace. The surveys for the rangeland developments would locate 12 sites based on 1 site per 319 acres and 40 acres surveyed for each water project. The trampling caused by wildlife would increase by approximately 50 percent; however, since most of the wildlife are found in rocky areas, they would have a low impact on trampling.

Improving erosion conditions on 62,586 acres would decrease the rate of site destruction on an estimated 196 sites. These sites would be available for study by archaeologists for a longer period of time.

The limiting of ORVs to existing roads and trails in the erosion areas would slightly decrease the amount of churning to the sites from current use. Fencing the riparian area along Percha Creek would eliminate the effects of trampling on any sites present in the area; since it is close to a water source, the probability of a site being present is greatly increased. The 42 exclosures would eliminate trampling on any sites present in them. By selecting 40-acre parcels that contain significant sites, there would be a high impact on the cultural resources. The elimination of trampling around Lake Holloman would protect an estimated three sites. By limiting ORV use to existing roads and trails, there would be a minor impact to cultural resources by eliminating churning to sites in the area. By limiting or closing ORV use at the Three Rivers Petroglyph Site and Picnic

Area, the Alamo Mountain petroglyphs, Lone Butte, and the Jarilla Mountains, the sites would be protected from vandalism and from churning caused by ORVs. The petroglyph sites are the most important Jornada Mogollon petroglyph sites known and the other two sites are a Paleo-Indian site and a small pueblo currently being affected by ORVs. By designating Rattlesnake Hill as closed to ORVs, a large Jornada Mogollon pueblo would receive significant protection from surface disturbance. By limiting surface disturbance to 1/4 mile from each side of the well-preserved segments of the Butterfield and Jornada del Muerto Trails, the trails would receive significant protection from actual surface disturbance and be protected from modern visual intrusions.

Under land tenure adjustment, there would be long-term affects to sites by transferring them out of Federal control. The affected areas were compared against the site files of the District Archaeologist to determine the sensitivity of the areas and known sites. Almost all of the parcels have the potential for containing small uncomplicated sites that can be mitigated by recording and minor testing. A number of the parcels have a strong potential for containing significant sites based on the surrounding known sites and the topography. They are as follows:

1. The cluster of parcels west of Pinon to the McGregor Range boundary

2. Upper Macho Creek parcels

3. Tierra Blanca Creek west of Highway 27

4. Trujillo Creek parcels

5. Parcels 79, 80, 92, 129, and 130

A number of parcels have known sites on them. They are as follows:

1. Parcels 68 and 94

2. Parcel on Tierra Blanca Creek east of Highway 27

3. Parcel on North Percha Creek (possibly)

4. Parcel 35 (cave sites)

5. Alamo Mountain petroglyphs

See Appendix A-1 and Visuals E and F for locations of parcels.

The 238 miles of new roads would cause long-term impacts to high site density areas near Lone Butte and the Jarilla Mountains with a major north-south route along the westside of the Jarilla Mountains to Lone Butte and U.S. Highway 70, and between Sand Hills Tank and the White Sands Missile Range boundary. The impact would come from the actual construction of the roads and more importantly, from increased access to culturally sensitive

areas. Pothunting and surface collection would increase in areas with better access. Assuming a 20-foot-wide right-of-way, the roads would disturb 2.42 acres per mile on 222 miles of new roads for a total of 437 acres. Based on 1 site per 319 acres, a total of 1 site would be located during cultural surveys for the new roads. Any degradation of cultural resources would result in irreversible and irretrievable losses of information.

Social and Economic Conditions

In order to estimate the social and economic impacts for each issue by alternative, several basic assumptions were made.

1. Due to the difficulty of predicting future livestock market conditions, the economic assessment was based on the assumption that current livestock market conditions would prevail.

2. The public opinions, attitudes, and concerns expressed in the Southwestern New Mexico Social-Economic Profile (1978), the Social-Economic Profile of the Border Region (1979), and the Sacramento Social-Economic Profile (1977) are still representative of the residents of the Resource Area.

3. The ranch budgets constructed for this assessment constitute a composite economic model which describes "typical ranches" and are not the budgets of any particular ranches.

4. The ranch budgets used for this assessment constitute an economic model of ranches as profit-maximizing enterprises and cannot completely describe any behavior that is influenced by noneconomic factors. In this regard, a standard allowance was made for depreciation of ranch equipment and improvements, although some ranch operators do not make full provision for such costs. These ranchers may have fully depreciated their capital investment; therefore, the allowance for depreciation may tend to overestimate the costs and underestimate profits.

5. It is assumed that those livestock operations that have Section 15 permits only did not represent the total operation; therefore, when estimating the various size categories, these permits were excluded.

6. The assessment of economic impacts is based on the assumption that none of the alternatives would change the calf-crop percentage or the average weight of animals marketed.

7. The ranch budgets were based on total herd sizes rather than just those numbers of AUs dependent on public land. Economic impacts were based on adjustments on BLM grazing lands as they relate to total operation.

In the short-term, livestock adjustments would decrease the existing herd sizes for all ranch operations. (See Table 4-5.) This could have a negative impact on the attitudes the livestock operators have towards the BLM since many operators have voluntarily reduced their herds below preference levels for financial or grazing management reasons. Some ranchers may perceive this as being unfair to those operators who had

TABLE 4-5
ESTIMATED ANNUAL COSTS AND RETURNS FOR INDIVIDUAL BLM RANCH OPERATIONS FOR OTERO COUNTY, 1982

Balanced Alternative

Budget Items	Short-Term				Long-Term			
	Small Cow-Calf 82 AUs	Medium Cow-Calf 274 AUs	Large Cow-Calf 986 AUs	Medium Cow-Sheep 513 AUs	Small Cow-Calf 90 AUs	Medium Cow-Calf 317 AUs	Large Cow-Calf 1,179 AUs	Medium Cow-Sheep 977 AUs
Total Receipts	13,597	48,958	227,141	105,556	15,206	57,172	277,211	216,055
Variable Costs	8,028	25,922	110,128	34,325	8,977	30,271	134,404	70,259
AUM Costs	2,378	5,944	19,019	9,002	2,575	6,889	23,919	19,352
Returns Above Variable Costs	3,191	17,092	97,994	62,229	3,654	20,012	118,888	126,444
Fixed Costs[a/]	2,132	3,472	14,396	7,047	2,132	3,472	14,396	7,047
Depreciation[a/]	5,322	11,009	25,041	21,163	5,322	11,009	25,041	21,163
Returns to Operator Labor, Management, and Capital	-4,263	2,611	58,557	34,019	-3,800	5,531	79,451	98,234

Source: BLM Las Cruces District Office Files, 1984.

Note: a/Fixed costs and depreciation are assumed to remain constant.

temporarily reduced their herds or who now need to increase their herd sizes to attain a profit.

The social values of living in the area would not change. Those individuals associated with the ranching way of life would undergo no significant social changes since the "rancher" identity would continue.

Since most agricultural operations are facing high production costs and low prices for their products, the reaction to a further reduction in income could cause individual ranchers to compensate by attempting to decrease their herd sizes, decrease employment, or other methods to keep production costs to a minimum. This could have an effect on the management of the operation. As shown in Table 4-5, the individual operations that would be most affected would be those that fall under the medium and large cow-calf operations. These operations would experience a change in returns from $1,895 to $2,611 for the medium cow-calf and from $65,475 to $58,557 for the large cow-calf operation.

Overall, there would be a decrease of approximately 8.5 percent in AUMs from the 5-year average for those allotments which are used by the 60 operators. This would reduce total receipts from ranching by approximately $341,902 in the Resource Area economy. (See Table 4-6.) See Appendix I-1 for individual ranch budgets and methodology used for analysis.

Ranch operations are valued by the number of AUMs they possess or control. In the short-term, readjustments of livestock grazing privileges from preference to the worst-case situation would reduce the value of BLM permits for borrowing purposes by 22 percent to $11.6 million. This would mean a decrease in the financial flexibility of the ranch operations.

The decrease in AUMs would not cause any major shifts in employment within the Resource Area economy; however, hired ranch labor would change to approximately 27 jobs from the existing 29 jobs. This would account for a decrease in wages and salaries paid for ranch employment of $12,719.

The reduction in employment within the Resource Area would be two jobs within the range livestock sector in the short-term; however, this number underestimates the direct impact due to the aggregation of the meat animals livestock sector in the regional model which includes all ranches and not just those that depend on public land for livestock grazing. Total regional employment would decline by five jobs. (See Appendix I-3 for information regarding methodology used for regional analysis.)

In the short-term, employee compensation (wages and salaries) would decline by approximately $49,000 in the Resource Area economy. The meat animals livestock sector would decrease by approximately $12,000. In the short-term over a period of 10 years, rangeland improvements including vegetation treatments would inject approximately $2.6 million into the regional economy. The cumulative effect would account for an estimated increase in employment of 50 jobs and an increase in employee compensation of approximately $621,000 or .43 percent from the current level over the

TABLE 4-6
ESTIMATED ANNUAL COSTS AND RETURNS FOR ALL BLM RANCH OPERATIONS
BY ALTERNATIVE FOR OTERO COUNTY, 1982

Budget Items	Existing a/	Balanced Alternative		Production Alternative		Protection Alternative		No Livestock Grazing Alternative
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term
Total Receipts	3,420,807	3,078,905	4,374,735	3,078,905	4,487,896	2,911,151	3,303,978	1,104,011
Variable Costs	1,712,575	1,435,178	1,932,833	1,435,178	1,988,158	1,351,322	1,542,176	521,090
AUM Costs	357,150	325,235	451,518	325,235	463,275	307,025	349,200	119,817
Returns Above Variable Costs	1,351,082	1,318,492	1,990,384	1,318,492	2,036,463	1,252,804	1,412,602	463,104
Fixed Costs b/	245,980	245,980	245,980	245,980	245,980	245,980	245,980	245,980
Depreciation b/	618,574	618,574	618,574	618,574	618,574	618,574	618,574	618,574
Returns to Operator Labor, Management, and Capital	486,528	453,938	1,125,830	453,938	1,171,909	388,250	548,048	-401,450

Source: BLM Las Cruces District Office Files, 1984.

Notes: a/The No Action Alternative in the short-term and the long-term is the same as the existing situation.
b/Fixed costs and depreciation are assumed to remain constant.

10-year period. The primary sectors affected would be those in the retail trade, eating and drinking places, and new construction.

In the long-term, as monitoring continues and the appropriate vegetation conversions and rangeland improvements are complete, along with the effective utilization of fire management, available forage would increase beyond existing levels. This would allow increased levels of livestock grazing and would result in a beneficial impact for most ranchers. Herd sizes are estimated to increase for all operations except small cow-calf from existing levels. (See Table 4-5.) The medium cow-sheep operation would become a large cow-sheep operation since the herd size would change from 520 AUs to 977 AUs (an 88 percent increase). Current management of the operation may change to account for the increase herd size. Since none of the cow-sheep operators fell within the large cow-sheep category under the existing situation, typical budgets for this operation were not developed. Therefore, under this alternative, it is presumed that economies of scale would occur to those operations which would be reclassified as large cow-sheep operations.

The social values, attitudes, and beliefs in the Resource Area would be reinforced and would be favorably affected for those individuals who have the identity and role of "rancher."

Total receipts from ranching would increase to just under $4.4 million from the existing $3.4 million. In the long-term, the 181,864 AUMs available for borrowing purposes would have a value of approximately $18.2 million and would enhance the financial flexibility of the operator.

Ranch operation employment would increase by 16 jobs from the 29 existing jobs, thus increasing salaries paid to ranch hands by $111,587. Total job opportunities within the Resource Area economy would increase by six jobs for the range livestock sector. Total employment for the Resource Area economy is estimated to increase by 16 jobs and employee compensation would increase by $153,469 or .105 percent from existing levels.

In summary, ranch operating conditions and trends would continue as at present, with positive improvements and beneficial economic effects accruing in the long-term. The AUM values for borrowing purposes would approximate the 5-year average, but would increase over the long-term.

In the long-term, if the 45,000 acres that have been identified for land tenure adjustment are successfully disposed of at fair market value, a significant impact to the Resource Area economy could occur. Based on a conservative estimate of fair market value, applied to potential highest and best use, these lands are valued at approximately $4.5 million. (See Appendix I-4.) Actual valuation of these tracts would be determined by a site-specific appraisal of these lands, actual location, and other factors involved in appraisals. These estimates are merely for analysis purposes only to identify an indication of significance on the lower end of the estimated fair market value. Assuming land values are not affected by the disposal of 45,000 acres of public land and assessed valuation at

33.3 percent of estimated value, the sale of the total acres would add $1.5 million or .6 percent to the total assessed valuation ($232.9 million) of the Resource Area economy. Estimated potential tax revenues amount to $24,000. The Resource Area economy receipt of payments in lieu of taxes would not be affected. (See Appendix I-4 for additional information.)

The construction and maintenance of 238 miles of new roads would inject approximately $6,207,000 into the Resource Area economy. This would have a positive economic effect within those small communities near construction of these roads.

Alternative II -- Production

Access

By constructing new roads or acquiring easements across non-Federal existing roads, access to public land would be guaranteed, resulting in fewer user complaints (of lack of access to public land) and an increase in the efficiency of managing public land.

Lands

The management action would decrease the number of acres of land under BLM management. This would significantly impact the lands resource in the short-term; however, about 3.25 percent (58,000 acres) of the available acreage would be affected, so the long-term impact would be negligible.

Geology and Minerals

Favorable short-term and, in particular, long-term impacts to mineral exploration and development could result from increased land accessibility stemming from the 422 miles of new roads proposed under this alternative. The removal of interim ORV restrictions on the Rattlesnake Hill area could also have a small impact on mineral activity. Removal of interim ORV limitations on 116,000 acres of McGregor Range would have impacts only if the area was also opened to mineral leasing.

Impacts to mineral exploration and development resulting from land tenure adjustments of up to 58,000 acres could occur, but would not be significant because of site-specific mineral reports which would be prepared for any proposed land exchanges or disposals. (See Chapter 2, Management Guidance Common to All Alternatives.) Any loss of revenue from mineral leasing or saleable minerals would also be insignificant

Soils

Under the Production Alternative, all allotments would be managed to achieve maximum forage production for livestock. Long-term livestock forage use would be 191,003 AUMs, 55,742 AUMs above the current 5-year average. Construction and installation of new rangeland developments would disturb soils on approximately 215 acres in the short-term. In the long-term, 42 acres of soils would be lost from production of native

vegetation. Medium and fine textured soils would be compacted around water facilities, cattle trails, and other areas where livestock concentrate. Compacted soils lower the infiltration rate of water, causing higher rates of runoff from these areas. Gullies and increased soil loss result when runoff water collects in cattle trails and flows down slopes. Soil loss by sheet erosion would increase slightly in areas where vegetation production and ground cover is decreased because of higher runoff from these areas. In areas of accelerated erosion, minor soil losses would be irretrievable. Long-term changes in erosion rates would be dependent on other factors (climate, nonvegetation ground cover, soil moisture, etc.) and would not be significant to the total erosion condition of the entire WSRA.

An estimated 145,115 acres would be chemically treated for brush control. Herbicides used for brush control usually are soil-applied (for uptake by roots), or foliar-applied (taken in through leaves). When applied, the herbicides infiltrate and are leached into the soil profile with rainwater. Studies have shown that most herbicides are adsorbed by soil particles and held in the upper part of the soil profile (Bovey et al. 1982; O'Connor et al. 1980). The herbicides would not leach farther than maximum infiltration of precipitation into the soil, thus would not contaminate underground water tables when applied using standard operating procedures. (See Appendix C-3.)

Once in the soil, the primary factors affecting the length of residual activity of the herbicides are microbial decomposition, chemical decomposition, and adsorption on soil colloids. There are no documented cases of herbicides, at normal rates under field conditions, significantly reducing microbial growth. On the contrary, detoxification of herbicides by microorganisms is a method of regulating persistence of many herbicides in the soil (Scifres 1980). Foliage-applied phenoxy herbicides are highly susceptible to microbial decomposition and are unlikely to persist into the succeeding year even at extremely high rates (Upchurch 1966). Other foliage-applied herbicides, such as Triclopyr, Dicamba, and Picloram, would be expected to also be susceptible to rapid microbial decomposition.

Soil applied herbicides such as Tebuthiuron are formulated to be leached into the soil, taken up by the roots, and are not decomposed as readily by soil microbes. Residues of Tebuthiuron persist in soils and are effective for 2 years or more following application (Bovey et al. 1982), depending on rates of application and soil types. Studies show a half-life of 27 days for Dowco 290, although further studies are needed to elucidate degradation and soil leaching characteristics under different soil conditions (Dow Chemical Company n.d.).

Soil erosion by wind and water would increase slightly in the short-term on the 145,115 acres which are chemically treated and 2,381 acres to be burned due to the decreased ground cover following treatments. In the long-term, wind and water erosion would decrease where ground cover is improved following the treatments. The changes in erosion rates would be confined to spray plots or pastures and would not be significant to the entire WSRA.

Under the Production Alternative, 62,586 acres would be considered for watershed treatments. The treatments would improve erosion condition of the watersheds by eliminating further headcutting, improving soil stability, increasing vegetation ground cover, and decreasing soil loss. Common watershed rehabilitation practices include gully plugs and rock check dams for stabilizing headcuts, wire checks, spreader dikes for more efficient use of runoff water, and reseeding for improved vegetation ground cover. The improved condition would be confined to small areas and thus would not be significant to the total erosion condition of the WSRA.

Under the Production Alternative, 1,754,265 acres of public land would be open to ORV use. Medium and fine textured soils would be susceptible to compaction by ORVs, especially when wet. ORVs form ruts on wet soils and destroy vegetation, leaving these areas susceptible to the formation of gullies. Gravelly and cobbly soils typical of hilly terrain also become susceptible to accelerated erosion if soil structure is altered by vehicles' tires spinning and loosening soils when travelling up hills. New State laws currently regulate hunters driving off-road, which eliminates some of the impacts which have occurred in previous fall hunting seasons when hunters concentrate in certain areas of the Resource Area. Recreational ORV activity would continue around populated areas, causing long-term irretrievable loss of soils, but the increases in erosion rates resulting from ORVs would be insignificant in the Resource Area.

In addition, approximately 1,021 acres of soils would be disturbed during the construction of roads to provide access to public land which presently has no access.

Water Resources

Under the Production Alternative, intensive management to achieve maximum forage production for livestock is proposed. Vegetation treatment would consist of chemical application on 145,115 acres and prescribed burning on 2,381 acres. Peak runoff rates would increase slightly on the treated areas for 2 to 3 years following the treatments. In the long-term, runoff rates would decrease an average of 17 percent on key range sites. (See Appendix B-1 for more detail.) This reduction in runoff would improve on-site utilization of water and lower amounts of suspended sediment and dissolved solids transported by runoff water.

Chemical treatments would be conducted using the same herbicides and procedures as discussed under the Balanced Alternative. The potential for contamination of water resources would be increased because of the

additional acres to be treated. Consequently, there would be the potential for water quality to decline slightly.

Consumptive water use by livestock and big game would be 181 acre-feet per year in the short-term and 234 acre-feet in the long-term, which would be a 29 percent increase in water presently consumed. Total water depletion in the long-term would be 462 acre-feet per year, which would be an irretrievable loss of the resource. Earthen stock tank evaporation would be approximately 214 acre-feet per year in the short-term and 228 acre-feet per year in the long-term. Change in water consumption by the wild burro herd would be insignificant.

Watershed values would be enhanced in the long-term on 62,586 acres of rangeland proposed for watershed treatments under this alternative. The objectives of watershed treatments include a reduction in peak runoff rates, a reduction in sediment yield, improved water quality, and better on-site utilization of runoff water. Future management plans would be tailored to meet these objectives.

New roads proposed under this alternative would be constructed to minimize drainage and erosion problems. In the short-term, slight increases in sediment yield would be expected. The degree of this impact would vary with the length and specific site area.

Vegetation

Under this alternative, vegetation would be disturbed or destroyed on 215 acres in the short-term and destroyed on 42 acres in the long-term from all proposed rangeland developments. (See Appendix D-6.) Grazing management treatments would be the same as under the Balanced Alternative, initially. The short-term consumption of forage would not change. Livestock grazing pressure would increase around proposed new waters and in a few instances, adjacent to new fences. Impacts resulting from the additional use would be offset by decreased pressure around existing waters and improved livestock distribution.

Under the Production Alternative, forage consumption in the short-term could decrease if monitoring studies indicate a need for a downward adjustment in livestock numbers. Monitoring studies would help determine a proper balance between forage produced and utilized on each allotment. Proper use for each species and relative species abundance also would be analyzed. These monitoring studies would indicate where adjustments would be needed to arrive at a stocking rate consistent with improving the vegetation resource. Most grazing studies in the Southwest show a need for a change in management, along with proper stocking rates, in order to obtain effective results in rangeland improvement (Cable and Martin 1964; Paulsen and Ares 1962; Canfield 1939). Specialized grazing systems have increased herbage production an average of 13 percent over continuous grazing while reductions in livestock utilization from heavy (60 to 80 percent) to moderate (40 to 60 percent) have increased production 35 percent (VanPoollen and Lacey 1979).

The long-term impact under this alternative would be an increase in production and cover of desirable and intermediate forage species preferred by grazing animals. Proper management, which provides for rest during critical periods of plant growth, could lead to an increase in plant species numbers. Reduced grazing pressure would increase plant vigor, leading to increased seed production and revegetation by seedlings, rhizomes, and stolons. If these desirable and intermediate plants are the climax species, they would out-compete the lower value species and reinvade the site (Stoddart et al. 1975).

The analysis of data from the vegetation inventory indicates that the poor or fair ecological condition classes are not relative to total production from all species, percent vegetation ground cover, or litter. However, these data do indicate a larger percentage of desirable and intermediate forage species in the higher condition class.

Permitted grazing use would be based on utilization patterns and trend studies, which are part of the monitoring procedure on Category I allotments. Adjustments needed to bring stocking rates in line with livestock grazing capacities would reduce pressure on desirable and intermediate forage species on overstocked allotments. Plant reproduction and vigor would increase as a result of reduced stocking rates and rest from livestock grazing during certain critical periods. Ground cover and forage species production would also increase from these changes.

Under the Production Alternative, short-term changes in each ecological condition class by range site would not be significant. Long-term changes would occur in each ecological condition class by range site as a result of grazing management treatments, rangeland developments, and 145,115 acres of vegetation treatments. (See Table 4-1 for a summary of total projected public land acres by ecological condition and forage value class by alternatives and Table 4-7 for these changes by range site under the Production Alternative.) Ecological condition class ratings would be expected to increase by 10 points on allotments under the Category I management scheme except for those areas where the existing rating is 0-10, indicating there is very little potential for improvement. Forage value class would change proportionately. Projections for changes in the number of acres in ecological condition or forage value class are based on the amount of potential for improvement that each individual site write-up area (SWA) possesses. (See Appendix C-8 for methodology.) In the long-term, desirable and intermediate grass and forb species would compete with undesirable species, increasing composition and ground cover. Vegetation production in 1982 was very low (see Table 3-3); as a result, analyses were not done on vegetation production.

This alternative would have the maximum acres of chemical treatments. Creosotebush on 99,989 acres, mesquite on 39,502 acres, and mixed desert shrub on 5,624 acres of public land would be chemically treated. Long-term impacts under the Production Alternative resulting from chemical treatment would vary depending on the range site. Range sites to be treated are gyp upland, deep sand, gravelly (SD-2 and -3), shallow (SD-3), shallow sandy, limy, loamy (SD-2 and -3), bottomland (SD-3), and sandy (SD-2).

TABLE 4-7
PROJECTED PUBLIC LAND ACRES BY RANGE SITE
FOR EACH ECOLOGICAL CONDITION AND FORAGE VALUE CLASS[a]

Alternative II -- Production

Range Site	Ecological Condition (acres)				Forage Value (acres)		
	Excellent	Good	Fair	Poor	Good	Fair	Poor
Southern Desert MLRA 42							
Gravelly							
SD-2		2,930	5,917		2,930	5,917	
SD-3	11,762	20,435	32,568	13,497	32,593	34,430	11,239
Deep Sand		192	44,782	4,364	192	45,585	3,561
Sandy							
SD-2			23,220	768	9,013	14,207	768
SD-3			4,868	2,159	591	4,868	1,568
Gyp Hills		1,562		12,991	1,562	8,472	4,519
Loamy							
SD-2			10,749	9,628	15,142	1,431	3,804
SD-3	3,552	49,779	53,615	33,203	54,584	50,439	35,126
Bottomland							
SD-2		119	701			224	596
SD-3			247	6,145		4,419	1,973
Limestone Hills							
SD-2		21	4,337	5,373	624	8,155	952
SD-3		101,411	78,003	2,974	133,775	45,639	2,974
Igneous Hills and Mountains		12,495	2,319	2,027	14,814		2,027
Salt Flats		1,830	6,268		8,098		
Shallow Sandy	2,929	40,851	67,749		109,865	1,664	
Gyp Upland		11,306	30,174	22,319	44,489	8,238	11,072
Draw				412		412	
Shallow	10,464	24,399	9,004	3,859	34,913	8,954	3,859
Limy		962	4,211	1,670	3,974	1,670	1,199
Pseudoriparian[b]				45		45	
Badlands[b]			10,404	3,305	2,202	2,290	9,217
Subtotal	28,707	268,292	389,136	124,739	469,361	247,059	94,454
Canadian-Pecos Plains MLRA 70							
Limestone Hills		9,312	87,382		76,812	19,882	
Shallow			83	1,155	83		1,155
Loamy		1,574	1,578	4,656	2,466	686	4,656
Swale		74	1,098		1,172		
Gravelly		4,313	802	1,690	2,484	4,313	8
Shallow Loamy		11,662	1,564		13,028	198	
Subtotal		26,935	92,507	7,501	96,045	25,079	5,819
TOTAL	28,707	295,227	481,643	132,240	565,406	272,138	100,273

Source: BLM Las Cruces District Inventory Data, 1982-1983.

Notes: a/Acres reflect only the areas transected during the 1982-1983 inventory.
b/Not a Soil Conservation Service range site; developed by BLM Las Cruces District for this document.

Five herbicides are proposed for use in controlling creosotebush and mesquite. Impacts of these treatments under the Production Alternative are Resource Area-wide. Chemically treated acres discussed under the Production Alternative are for Otero County and parts of Lincoln, Eddy, and Chaves Counties. Tebuthiuron (Graslan) is a pelletized herbicide used on both creosotebush and mesquite. Picloram, Dicamba, Triclopyr, and Dowco 290 are foliar herbicides used on woody species and broadleaf weeds. Appendix C-3 contains guidelines for use and restrictions of applications for the herbicides except for Dowco 290, which is not labeled at the present time.

Short-term impacts would occur within 1 to 3 years following application of chemicals. Pelletized treatments would be a gradual kill over this 3-year period. Foliar spray effects would be more immediate, usually killing plants by the second year. The average percent kill with chemical treatments would be 40-60 percent when used as recommended. Foliar sprays are absorbed from leaf surfaces or cuticles and transported to actively growing plant parts. Herbicide movement is favored by good soil moisture and growing conditions. Granular herbicides are leached into the soil to the plant's rooting zone following rainfall and are absorbed by the plant's root system.

Tebuthiuron would be used primarily on creosotebush, where it has proven effective at low rates of application. Higher rates of application would be effective on mesquite. Forb and grass growth can be reduced or damaged by Tebuthiuron when it is applied during active growth at greater than 3/4 pounds active ingredient per acre (AI/Ac) (Baur 1978). Injury can be avoided when applications are done during the winter months, causing no damage to forbs and grasses (Herbel 1982). Tebuthiuron's photosensitivity breakdown time is being further studied so granules can be applied during any season.

Dicamba is a herbicide effective for broadleaf weed and brush control. Mesquite can be substantially reduced or killed by using Dicamba (Bovey 1977). Creosotebush is also susceptible to both a foliar spray and soil treatment of Dicamba. Dicamba may be used in the form of granules for ground application (5 percent active ingredient per granule), or a water soluble liquid for aerial spraying.

Dicamba would be toxic to actively growing forbs. Those forbs that initiate growth while Dicamba is still present would also be defoliated or killed (Bovey 1977). Forb production would increase after the herbicide had dissipated. Nontarget brush species such as tarbush would be defoliated (Bovey 1977) along with the target species (creosotebush and mesquite). Residues of Dicamba, either sprays or granular, would not persist in vegetation longer than 1 year after treatment, because it is susceptible to thermal degradation (Baur et al. 1974; Scifres and Allen 1973). Dicamba is resistant to photodecomposition, and would persist longer than 2,4,5-T (Baur et al., 1974).

Picloram is a herbicide effective on some annual and perennial weeds. In a short-grass vegetation type in Arizona, Picloram produced a 95

to 100 percent kill of snakeweed (Little and Schmutz 1970). Past studies show Picloram to be intermediately effective in controlling creosotebush (Schmutz 1967). Foliar sprays of Picloram are effective in controlling mesquite (Bovey and Mayeux 1980), whereas soil applied pellets are ineffective (Meyer 1982; Kitchen et al. 1980). Picloram may be used in the form of a water miscible liquid, pellets, or granules (10 percent active ingredient per granule).

Picloram use would prevent germination of grasses and would defoliate nontarget shrubs in the treatment area, such as acacia. Other shrubs, such as pricklypear and sumac, would be reduced or killed (Bovey 1977). Picloram would be more persistent in vegetation than Dicamba because it is resistant to microbial degradation in the soil (Scifres and Allen 1973).

Triclopyr is an herbicide effective in controlling broadleaf weeds and woody plants. For the best results, applications should be made when woody plants and weeds are actively growing. When hard to control species are prevalent and during applications made in late summer when the plants are mature or during drought conditions, higher rates should be used. On sites where easy to control brush species dominate, rates less than those recommended may be effective.

The control of herbaceous plants is increased with ammonium salts (Picloram), benzoic acids (Dicamba), and substituted ureas (Tebuthiuron) (Sosebee and Dahl 1979). Brock et al. (1970) found that neither Dicamba nor Picloram sprayed at 0.5 pounds AI/Ac reduced grass seedlings. Rates of 1 pound AI/Ac reduced the number of grass seedlings, but not significantly. All herbicide rates of either Dicamba or Picloram substantially reduced forb production (Sosebee and Dahl 1979).

Dowco 290 induces auxin-type responses in growing plants. When used in combination with phenoxy herbicides, it has proved to be very effective in controlling phenoxy-tolerant weeds. This herbicide does not usually affect grasses.

Herbicide tolerance by grasses generally increases with stages of plant growth, but grasses differentially respond to the type and rate of herbicide used (Halifax and Scifres 1972; Scifres and Halifax 1972). Half shrubs and woody plants are more susceptible to herbicides than grasses. Picloram (0.25 to 2.0 pounds AI/Ac) was the most effective liquid herbicide used to control Chihuahuan desert shrubs, whereas phenoxy herbicides were less effective (Sosebee and Dahl 1979). Forb growth would probably begin increasing during the third growing season. The reduction of forbs as part of the useable forage for livestock would have a minor effect due to the two growing season deferment after treatment.

As the competition for available moisture is reduced, forage species would increase. This increase of additional forage would be three or four times what was previously available.

Martin (1966) found on pastures where mesquite was sprayed, the estimated number of animal units (AUs) to graze 40 percent of the perennial

grass crop increased by 169 percent between 1954 and 1961. Cable and Martin (1964) show a perennial grass production increase on mesquite sprayed areas from 220 pounds to 443 pounds per acre. The Jornada Experimental Range Annual Research Progress Report (CY 1979-USDA 1980) indicates a three to eight time production increase of perennial grasses on sprayed areas as opposed to untreated areas in a 3-year period. Stocking rates increased three to four times.

Although good rangeland management practices would prolong the benefits of brush control, retreatment could be needed in 15 to 20 years if brush species started to reinvade the site (National Research Council 1968; Herbel 1982).

Seeding and interseeding of native plants are proposed for 1,597 acres under this alternative. A total of 2,381 acres is proposed for controlled burns on tobosa and sacaton areas to remove litter and stimulate production.

Ground cover would be expected to increase from the existing situation in the long-term depending on the range site and residual plant community on these treated areas. The proposed rangeland improvements and treatments identified as necessary to implement management actions would impact vegetation. Many of these projected improvements would lead to improved livestock distribution and the production of better quality and quantity of forage.

The projected changes in the number of acres in each ecological condition and forage value class as a result of changes in species composition are shown in Table 4-7. The number of acres in excellent condition would increase from 0 to 28,707, in good from 138,216 to 295,227, and fair from 386,596 to 481,643. The number of acres in poor ecological condition would decrease from 413,005 to 132,240. The number of acres in each forage value class would increase in good from 422,239 to 565,406 and fair from 252,401 to 272,138 and decrease in poor from 263,177 to 100,273. Acres in ecological condition and forage value classes would change due to proposed rangeland developments, grazing management treatments, and increased acres of vegetation treatments.

Under land tenure adjustments, approximately 58,000 acres would be lost from BLM jurisdiction within the Resource Area.

In the process of providing legal access to public land, vegetation on an additional 1,021 acres would be lost in the construction of 422 miles of new road within the Resource Area.

Threatened or Endangered Plant Species

Most of the threatened or endangered plant species are located in areas where livestock grazing is limited due to rocky or mountain slopes. Many are unpalatable and would seldom be grazed. These plants could be damaged from trampling or from livestock grazing the associated species. Impacts on threatened or endangered plant species and their habitat would be

less due to the reduction in livestock numbers in the short-term on areas with no chemical treatment. However, in the long-term, livestock numbers would increase. Site-specific mitigation would be required prior to implementation of any action which would cause a "may affect" determination.

Livestock Grazing

Under this alternative, Categories I, M, and C allotments would apply. Short-term reduction from preference to 116,079 AUMs or 22 percent below the grazing preference would be held in suspended preference. Chemical vegetation treatments have been proposed on 145,115 acres of creosotebush, mesquite, and mixed desert shrub. There would be a 12,417 AUM increase on 45 allotments after treatment. Livestock grazing on these treated areas in the short-term would be excluded for a minimum of two growing seasons to give perennial forage a chance to reestablish. The increased forage production in the long-term would offset reduced livestock grazing use during the deferment.

In the long-term, due to increased numbers of rangeland developments and acres of vegetation treatments, anticipated forage response would provide for 43,087 AUMs above preference (147,916 AUMs). Projected livestock grazing use in the long-term would be 191,003 AUMs or a 29 percent increase above preference. This projected increase of livestock forage would be dependent on implementing grazing systems, installing rangeland developments, and establishing land treatments to increase forage productivity and improve distribution patterns. See Appendix D-9 for carrying capacity and management status by allotment under the Production Alternative.

Rangeland monitoring studies would determine the grazing capacity over the long-term. Category M allotments receiving vegetation treatments or additional rangeland developments would be placed in Category I.

Under land tenure adjustment within the Resource Area, approximately 58,000 acres would be lost from BLM jurisdiction and 8,504 AUMs would be removed from BLM authorization. Grazing fees from these 8,504 AUMs of grazing use would no longer be received. Under this alternative, Section 3 allotments may not be affected while Section 15 allotments have the potential to be affected.

In the process of providing legal access to public land, an additional 150 AUMs would be lost in the construction of 422 miles of new road within the Resource Area.

Wild Burros

Under this alternative, wild burros would be removed from the Three Rivers area. In the short- and long-term, wild burros would be removed from the natural ecological system and would not be available for public viewing.

In the long-term, removing burros would increase vegetation densities, reproduction, and productivity. There would be an increase in forage available for livestock and big game use in both the short- and long-term.

Wildlife

Standard Habitat Sites (SHS's)

In the long-term, the most acres would improve to fair ecological condition under this alternative and a high percentage of acres (Table 4-3) would change to the good ecological condition class. It is assumed that the distribution of change between habitat sites would be as shown in Table 4-3. It is assumed that most of the proposed vegetation treatments would occur in creosotebush and mesquite habitats and that brush species would not be eliminated. There are no known significant differences in the effects of different chemicals on wildlife species or habitat, and no known significant direct impacts from use of the chemicals. Table 4-3 indicates that there is a generally higher diversity index for shrub habitats (creosote rolling upland) than for the grassland habitats on the same landform (grass rolling upland), except for birds, which show a generally higher diversity in the grassland habitats. With a decrease in the shrub component and an increase in grass, there should be an increase in both plant and animal diversity.

The open designation for ORV use would be insignificant for SHS's under present ORV use levels for both the short- and long-term. If ORVs concentrate in pseudoriparian areas, there could be an insignificant increase in shrub destruction.

The location of sites included under land tenure adjustments would determine the impact occurring to SHS's. It would be a potentially significant impact if interest was shown in the pseudoriparian and mixed shrub mountain habitat sites, which together total about 39,000 acres as compared to 58,000 acres included under land tenure adjustment. Alternately, the impacts of land tenure adjustment would be minor if all sites are located in the creosote rolling uplands and mixed shrub hill SHS's.

Construction of 422 miles of roads would eliminate approximately 1,021 acres of various habitat sites in the long-term. There appears to be a tendency to locate roads in or near arroyo bottoms (unquantified) and if 50 percent of the needed roads are constructed in the pseudoriparian habitat, 5 percent of the site would be significantly changed. The percentage of acres involved would decline to insignificance in the more abundant habitat sites.

Big Game

Forage would be provided for the current populations of mule deer and pronghorn with no provisions for population increase in both the short- and long-term. With a long-term improvement in ecological condition, production of preferred browse species would increase, which would permit an increase in populations of deer and pronghorn. The long-term increase to 191,003 AUMs for livestock would, however, tend to suppress populations, perhaps below present levels, because of the potential increase in livestock use on preferred browse species.

If ORVs concentrate in pseudoriparian areas, there could be a long-term insignificant increase in shrub destruction.

Approximately 50 percent of the inventory deer observations were in the pseudoriparian and mixed shrub mountain habitat types which together consist of about 39,000 acres, all of which could be disposed of under this alternative. The ultimate impact would depend on land use, but under a long-term worst-case situation about 50 percent of the big game animals in the SHS would be lost because of habitat loss.

The impact of new roads on big game animals would depend on the proximity of the roads to big game habitat components. In the long-term, road construction would remove browse plants and, in effect, cause the loss of approximately 1,021 acres of big game habitat. In the long-term, the amount and type of use on the proposed roads would determine the ultimate effect on big game. Severson and Medina (1983) report that "The impacts of human disturbances on big game have not been researched in the Southwest," but research has been done in other western states and the degree of impact varies with vegetation type. Road avoidance by deer is greatest in shrublands. Acres of habitat lost varies from 45 acres per mile for interstate highways to 7 acres per mile for county roads. Other factors detrimental to big game could also increase with new access, including animal vehicle accidents and poaching.

Small Game

The overall long-term improvements in ecological condition would tend to increase plant diversity which provides improved habitat for quail species.

Waterfowl

The nine proposed earthen stock tanks would provide new habitat for waterfowl, but the projected long-term increase in livestock AUMs implies heavy use on shoreline vegetation and low reproductive success.

Threatened or Endangered Fauna Species

The increased chemical treatments of brush species under this alternative would increase the long-term habitat improvements for grassland species such as the aplomado falcon and McCown's longspur.

Recreation

New access associated with proposed rangeland developments would result in a change of 29,000 acres from the semiprimitive nonmotorized (SPNM) class to the semiprimitive motorized (SPM) class. This would be a 9 percent reduction in the recreation opportunities associated with the SPNM class and a 2 percent increase in the recreation opportunities associated with the SPM class. The majority of this change would occur in southeastern Otero County. This would result in slightly improved recreation access in the affected areas in the long-term and a slight potential for increased

recreational use of the areas. This could increase slightly the interaction between recreational and nonrecreational users.

The open ORV designations are, in effect, a continuation of the existing situation and would result in continued availability of recreation opportunities to all users and groups. ORV use could increase insignificantly in the long-term.

In the long-term, land tenure adjustments would affect recreation opportunities in a variety of ways. The land near Lake Valley contains jasper and calcite of collectable quality and quantity. Areas identified for ownership adjustment along the Tularosa River contain recreation opportunities which are dependent on live water and riparian vegetation. These opportunities are scarce in the Resource Area. The parcel in Beeman Canyon, part of the Sacramento Escarpment, also contains unique recreation opportunities dependent on the area's rugged and scenic topography. Transfer of these lands into non-Federal ownership could affect the availability of the recreation opportunities to the general public.

The 422 miles of new roads proposed under this alternative would have a significant long-term effect on the Resource Area's recreation opportunities. Approximately 145,000 acres would change from the SPNM to the SPM classification. This would be a 46 percent reduction in the recreation opportunities associated with the SPNM class and a 9 percent increase in the recreation opportunities associated with the SPM class. The majority of this change would occur in southeastern Otero County. This would result in improved access for all recreation activities and could result in increased recreational use and a significant increase in contact between recreational and nonrecreational users.

Visual Resources

Visual contrasts would occur from the structures and surface disturbance associated with the proposed rangeland developments, vegetation treatments, and additional roads.

Although rangeland developments would have a slight overall impact on the area's visual quality, individual projects would result in moderate long-term local impacts depending on locations and visibility of the developments.

Vegetation treatments would result in direct impacts to visual resources on 149,093 acres. The short-term impact of standing dead and dying brush would be significantly reduced in the long-term as grasses and forbs are reestablished.

The transfer of Beeman Canyon into non-Federal ownership could affect the long-term visual quality of the area.

Wilderness

The rangeland developments within the Brokeoff Mountains WSA could cause long-term impacts to the local area's naturalness. The pipeline,

drinking trough, earthen stock tank, and associated vehicular access within the former Little Dog Canyon WSA, part of the Guadalupe Escarpment, could cause impacts to the local area's naturalness and could foreclose future options to consider the area for a wilderness designation.

Cultural Resources

Under this alternative, livestock grazing would increase 29 percent in the long-term. This would increase the trampling of cultural resources and cause a severe impact in the long-term. The burning of 2,381 acres could cause damage to lithics on the surface of the ground through spauling due to extreme heat. The construction of rangeland developments would locate 14 sites, assuming 1 site per 319 acres and 40 acres surveyed for each water project. The slight trampling impact caused by wildlife would remain the same. The improvement in erosion condition on 62,586 acres could decrease the rate of destruction for 196 sites. This would provide archaeologists a longer period of time to study those sites. The areas involved have a fairly high probability of containing sites. The elimination of the burro herd would cause an insignificant decrease in trampling.

Open ORV use of Three Rivers and Rattlesnake Hill could cause significant long-term impacts to cultural resources.

Under land tenure adjustment, there would be long-term effects to sites by transferring them out of Federal control. The affected areas were compared against the site files of the District Archaeologist to determine the sensitivity of the areas and known sites. Almost all of the parcels have the potential for containing small uncomplicated sites that can be mitigated by recording and minor testing. A number of the parcels have a strong potential for containing significant sites based on the surrounding known sites and the topography. They are as follows:

1. The cluster of parcels west of Pinon to the McGregor Range boundary

2. Upper Macho Creek parcels

3. Tierra Blanca Creek west of Highway 27

4. Trujillo Creek parcels

5. Parcels 79, 90, 92, 129, 130

A number of parcels have known sites on them. They are as follows:

1. Parcels 68, 87, 94

2. Parcel on Tierra Blanca Creek east of Highway 27

3. Parcel on North Percha Creek (possibly)

4. Parcel 35, cave sites

See Appendix A-2 and Visuals E and F for locations of parcels.

The new roads in the mesa could lead to increased access to sites south of Pinon. The new road east of Alamo Mountain is on part of the Butterfield Trail. The new roads in T. 15-17 S., R. 1 E., are in an area of probable high site density; this would lead to increased vandalism over time with improved access. The proposed roads north of the Jarilla Mountains are in an area of high site density, including Lone Butte, identified as an area of special concern in other alternatives. Construction of these roads would lead to increased vandalism in the long-term. Any degradation of cultural resources would result in irreversible and irretrievable losses of information.

Social and Economic Conditions

In the short-term, livestock adjustments would reduce existing herd sizes for each ranch size category. The small cow-calf operation would change from an average of 97 AUs to 82 AUs, the medium cow-calf operation would change from 304 AUs to 274 AUs, the large cow-calf operation would change from 1,079 AUs to 986 AUs, and the medium cow-sheep operation would change from an average of 520 AUs to 513 AUs. Overall, there would be an 8.5 percent decrease in AUMs from the 5-year average. Total receipts from ranching would decline by approximately $341,902 in the Resource Area economy. (See Table 4-6.) The value of BLM permits for borrowing purposes would be reduced by 22 percent to $11.6 million. Hired ranch labor would decline by 2 jobs. Total employment is estimated to decline by 5 jobs. Employee compensation is estimated to decline by $49,000.

In the short-term over a period of 10 years, the BLM Las Cruces District would expend just over $5 million for rangeland improvement projects including vegetation treatments. The cumulative effects would result in an additional 98 job opportunities and an estimated increase of $1.2 million or .83 percent of total regional employee compensation in the Resource Area economy. The primary sectors that would be affected would be the retail trade sector which would receive 27 percent of the increase in jobs, eating and drinking places 12 percent of the increase, new construction 7 percent, and maintenance and repair construction 3 percent of the increase in job opportunities.

In the long-term, the continuation of the small community lifestyles, particularly the ranching lifestyle, would be ensured. The aspects which make the area an attractive place to live such as the friendly people and the slower pace of life would not be significantly altered.

If the ranch operators would increase their operations to take 100 percent advantage of the available AUMs under this portion of the alternative, then they would receive a significant beneficial impact on rancher wealth for a short period of time. The possibility exists that livestock grazing at 100 percent preference for 3 to 5 years may abuse the rangeland to the extent that monitoring data may indicate the need to drop licensing below these active levels. Should this occur, some ranchers may be severely affected depending on their ranch operation and amount of usage.

In the long-term, there would be an overall increase in AUMs for total operations of approximately 28 percent from existing levels. All operations would remain in their respective ranch size categories except for the medium cow-sheep operation. This operation would experience an 88 percent increase in herd size and would be reclassified as a large cow-sheep operation. Current management practices and disposition of the operation may change to account for the increased herd size. Since none of the operators fell within the large cow-sheep operation under the existing situation, typical budgets for this size operation were not developed. Therefore, under this alternative, it is presumed that economies of scale would occur to those operations which would be reclassified as large cow-sheep operations. Overall, total receipts from ranching would increase by $1.1 million. Total receipts for the individual small cow-calf operation would decrease by $2,085, the individual medium cow-calf operation would have an increase in total receipts of $5,226, and the individual large cow-calf and the individual medium cow-sheep operations would have an increase in total receipts of $39,509 and $109,062, respectively. (See Table 4-8.) Appendix I-1 contains additional information on individual ranch budgets. The BLM grazing permit value for borrowing purposes would increase to $19.1 million from $14.8 million or by approximately 29 percent. This would provide the ranch operators with additional financial flexibility for their operations.

Ranch operation employment overall would increase by 17 jobs from existing levels. The medium cow-sheep operation is estimated to receive 15 of the 17 job opportunities for ranch employment. Employee compensation would increase by $117,243.

Approximately 18 job opportunities would be gained in the Resource Area economy. Employee compensation would increase by approximately $172,653 or .1183 percent of total employee compensation for the Resource Area economy.

Complete transfer of 58,000 acres would increase private ownership by approximately 6.4 percent in the Resource Area in the long-term. This is assuming all the lands available for disposal are sold to private parties. Based on a conservative estimate of fair market value applied to potential highest and best use, these lands are valued at approximately $5.8 million. (See Appendix I-4.) Estimated assessed valuation would be approximately $1.9 million and could provide tax revenues of approximately $30,971. Payment in lieu of taxes for the Resource Area economy would not be affected. (See Appendix I-4.)

The construction and maintenance of 422 miles of new roads would inject approximately $8.6 million into the Resource Area economy. This would have a positive economic effect, especially within those small communities near construction of these roads.

Alternative III -- Protection

Access

By constructing new roads or acquiring easements across non-Federal existing roads, access to public land would be guaranteed,

TABLE 4-8
ESTIMATED ANNUAL COSTS AND RETURNS FOR INDIVIDUAL BLM RANCH OPERATIONS FOR OTERO COUNTY, 1982

Production Alternative

Budget Items	Short-Term				Long-Term			
	Small Cow-Calf 82 AUs	Medium Cow-Calf 274 AUs	Large Cow-Calf 986 AUs	Medium Cow-Sheep 513 AUs	Small Cow-Calf 88 AUs	Medium Cow-Calf 340 AUs	Large Cow-Calf 1,259 AUs	Medium Cow-Sheep 980 AUs
Total Receipts	13,597	48,958	227,141	105,556	14,857	61,731	289,187	216,790
Variable Costs	8,028	25,922	110,128	34,325	8,771	32,685	140,211	70,498
AUM Costs	2,378	5,944	19,019	9,002	2,532	7,413	25,090	19,421
Returns Above Variable Costs	3,191	17,092	97,994	62,229	3,554	21,633	123,886	126,871
Fixed Costs[a/]	2,132	3,472	14,396	7,047	2,132	3,472	14,396	7,047
Depreciation[a/]	5,322	11,009	25,041	21,163	5,322	11,009	25,041	21,163
Returns to Operator Labor, Management, and Capital	-4,263	2,611	58,557	34,019	-3,900	7,152	84,449	98,661

Source: BLM Las Cruces District Office Files, 1984.

Note: a/Fixed costs and depreciation are assumed to remain constant.

resulting in fewer user complaints (of lack of access to public land) and an increase in the efficiency of managing public land.

Lands

Approximately 154,000 acres of land would no longer be available for BLM management. This figure is about 8.5 percent of the acreage currently under BLM management and is a significant amount in both the short- and long-term. Additionally, about 23,000 acres (1.25 percent) would be acquired. This would be a negligible impact both in the short- and the long-term.

The blocking-up of public land by disposal and acquisition (exchange) would result in better management of those lands than is currently available with the dispersed land ownership pattern. Approximately the same number of acres would be disposed of as would be acquired in an exchange.

Geology and Minerals

Short- and long-term impacts to mineral resources as a result of the implementation of this alternative would be essentially identical, barring market changes, which are unpredictable at present. Impacts would result primarily from one of the following: (a) the designation of Special Management Areas as closed or limited to ORV travel, limited surface disturbance, NSO, or withdrawn from mineral entry; (b) the transfer of mineral or associated surface estate from BLM to private or other jurisdiction; and (c) the development or acquisition of access. The first action is the only one expected to have any impact on mineral exploration or development.

The designation of areas as limited to ORV use, closed to ORV use, limited surface disturbance, as NSO, and as withdrawn from mineral entry could significantly impair mineral exploration and development, primarily because the proposed locations of many of these designations are in areas of moderate to high mineral potential. The following areas are of particular concern.

Three Rivers Watershed Treatment Area (21,446 acres)

This area coincides with the Southern Sierra Blanca coal field. Limitation of ORV use in the area could inhibit exploration and development.

Percha Creek Riparian Area (320 acres)

Located within the Hillsboro mining district, this area has produced gold, silver, and copper. Fencing of this area would effectively prohibit mineral development and production and greatly inhibit mineral exploration. Additionally, BLM mining claim records dated September 17, 1984, show numerous mining claims located in this area.

Cornudas Mountains (15,490 acres)

This area is known to contain rare earth minerals, including beryllium. The limitation of ORV travel could inhibit mineral exploration, particularly because the designation covers such an extensive area. Additionally, BLM mining claim records dated September 17, 1984, show numerous mining claims located in the area.

Alamo Mountain (340 acres)

This is an area of high-quality limestone. A NSO designation and closure to ORV travel would prohibit mineral exploration.

Jarilla Mountains (320 acres)

Gold, copper, iron, and other locatable minerals have been produced from this vicinity. Closing the area to ORV travel could inhibit future mineral exploration. Additionally, BLM mining claim records dated September 17, 1984, show numerous mining claims located in the area.

Butterfield Trail (2,220 acres)

Limitation of surface disturbance in this area, parts of which contain beryllium and other rare earth minerals, would inhibit mineral exploration and development.

Jornada del Muerto Trail (1,252 acres)

The northern part of the area proposed under this alternative lies within the Engle coal field. Limitation of surface disturbance would inhibit mineral exploration and development.

Cuchillo Mountains (6,160 acres)

This area has produced gold, silver, iron, and other locatable minerals in the past. Limitation of ORV travel could inhibit mineral exploration and development. Additionally, BLM mining claim records dated September 17, 1984, show numerous mining claims located in the area.

Lone Butte (320 acres)

This area has potential as a possible source of aggregate for road construction. Limitation of ORV travel would effectively prohibit the development of this resource.

The proposed limited ORV designations of the Tularosa Southeast and Brokeoff Mountains watershed areas would have slight impacts to mineral resources (sand and gravel in the Tularosa area and sodium in the Salt Basin), but they would be insignificant. Impacts could result from the withdrawal of 4,300 acres of land from mineral entry along the Sacramento Escarpment, but would be insignificant.

Impacts resulting from the designation of 92 40-acre study plot exclosures would probably be insignificant because of their small size, unless located within a known mining area. The limitation of ORV travel on 7,779 acres of public land in the Brokeoff Mountains could affect mineral exploration and development, but it is not expected to be significant.

Land tenure adjustment could remove up to 154,000 acres of mineral or associated surface estate from BLM jurisdiction, although the actual figure is expected to be much lower. Many of the lands earmarked for disposal under this alternative fall within areas of moderate to high mineral potential. These include lands valuable for locatable minerals in the Cuchillo Mountains, Hillsboro area, and Macho mining district, and lands valuable for sand and gravel resources along the Sacramento Escarpment. As mentioned in Chapter 2 (Management Guidance Common to All Alternatives), however, site-specific mineral investigations would be made on any lands proposed to leave BLM jurisdiction. Because of this, impacts would be insignificant. Any loss of revenue from mineral leases or saleable minerals would also be insignificant.

The development or acquisition of 165 miles of roads could have a small impact on mineral exploration, although this would not be significant.

Soils

Under the Protection Alternative, livestock grazing would be reduced 50 percent on 413,005 acres in poor ecological condition and 25 percent on 386,596 acres in fair ecological condition in the short-term. Soil loss would decrease slightly where vegetation condition and ground cover is improved. Long-term changes in total soil loss rates would not be significant when livestock forage use is 130,115 AUMs, approximately 4 percent below the current 5-year average.

Construction and installation of rangeland developments would disturb soils on approximately 196 acres in the short-term. In the long-term, 38 acres of soils would be lost from production of native vegetation by the newly installed developments.

Under the Protection Alternative, 73,601 acres would be considered for watershed treatments. The treatments would improve erosion condition of the watersheds by eliminating further headcutting, improving soil stability, increasing vegetation ground cover, and decreasing soil loss. The improved erosion condition of the treated areas would not significantly change the erosion condition of the total WSRA.

Under the Protection Alternative, 1,524,355 acres would be open to ORV use. Medium and fine textured soils would be susceptible to compaction and formation of ruts by ORVs, leaving these soils susceptible to the formation of gullies. Gravelly and cobbly soils typical of hilly terrain also become susceptible to accelerated erosion if soil structure is altered by vehicles' tires spinning and loosening soils when travelling up hills. Recreational ORV activity would continue around populated areas and during

organized events, causing long-term irretrievable loss of soils, but overall increases in erosion rates resulting from ORVs would be insignificant in the Resource Area.

Approximately 327 acres of soils would be disturbed and lost from production of native vegetation during construction of approximately 135 miles of roads under the Protection Alternative in the long-term.

Water Resources

Under the Protection Alternative, livestock grazing on all allotments would be reduced in the short-term. Emphasis would be on reducing AUMs from range sites in the poor and fair ecological condition classes. In the long-term, there would primarily be an increase in the number of acres in good ecological condition and subsequently an improvement in vegetation ground cover. Peak runoff rates would decrease an average of 14 percent on key range sites. (See Appendix B-1.) This reduction in runoff would improve on-site utilization of water, and lower amounts of suspended sediments and dissolved solids transported by runoff water.

Consumptive water use by livestock would be 113 acre-feet per year in the short-term, a decrease of 31 percent. After 20 years, water consumption by livestock, wildlife, and wild burros would be only slightly less than present use. Total water depletion in the long-term, including earthen stock tank evaporation, would be 390 acre-feet per year. This would be an irretrievable loss of the resource.

Watershed improvements that would include both structural and land treatment measures would address the problems of flood and sediment damage. The primary objectives of watershed treatments would include a reduction in peak runoff rates, a reduction in sediment yield, improved water quality, and better on-site utilization of runoff water in the long-term. Future management plans would be tailored to meet these objectives on 73,601 acres of rangeland.

ORV use would be limited to existing roads and trails on 73,601 acres of rangeland as part of future watershed plans. This action would help to improve vegetation cover in the long-term, and reduce peak runoff rates and sediment yield.

The riparian area along Percha Creek would be fenced to eliminate livestock use. This action would improve channel stability of the stream in the long-term.

Limiting ORV use to existing roads and trails for McGregor Range north of State Road 506 would have only a slight impact on watershed improvement. The primary impact would be to maintain the area in its present watershed condition.

New roads proposed under the Protection Alternative would be constructed to minimize drainage and erosion problems. In the short-term,

slight increases in sediment yield would be expected. The degree of this impact would vary with the length and specific site area.

Vegetation

Short-term consumption of forage under the Protection Alternative would be approximately 10 percent less than the 5-year average. The reduction would be to improve the ecological condition on fair and poor rangeland. This reduction in stocking rates would reduce the use of the forage species. Studies show that after 6 years, lightly-grazed pastures have 30 percent more cover than heavily-grazed pastures (Dickson et al. 1948). Comparison area studies in the Las Cruces District show that with a light grazing intensity, vegetation ground cover was 87 percent and litter accumulation 44 percent more than on adjacent heavily-grazed areas (BLM 1973). In the long-term, the projected livestock forage use would be 130,115 AUMs as a result of proposed grazing management treatments and rangeland developments.

Under the Protection Alternative, vegetation would be disturbed or destroyed on 196 acres in the short-term and 38 acres in the long-term from proposed rangeland developments. Grazing pressure would increase around proposed new waters and in a few instances, adjacent to new fences. Impacts resulting from the additional use would be offset by decreased pressure around existing waters and improved livestock distribution.

Areas eliminated from livestock grazing to protect riparian habitat along Percha Creek, Lake Holloman, and adjacent lands (2,840 acres) would be expected to recover in the long-term if soils are stabilized and new wood and herbaceous species are allowed to reestablish themselves. Ground cover would increase to some degree, stabilizing soils.

The projected changes in the number of acres in each ecological condition and forage value class as a result of changes in species composition are shown in Table 4-9. The number of acres in each ecological condition class would increase in excellent from 0 to 8,950; good from 138,216 to 337,781; and fair from 386,596 to 403,876. The number of acres in poor ecological condition would decrease from 413,005 to 187,210. The number of acres in each forage value class would increase in good from 422,239 to 572,546 and decrease in fair from 252,401 to 200,528 and poor from 263,177 to 164,743. Acres in ecological condition and forage value classes would change due to proposed grazing management treatments, rangeland developments, and reduction in livestock numbers. This alternative would not have any vegetation treatments.

Designation of the Sacramento Escarpment as an ACEC would benefit vegetation through more intensive management. The ACEC would be closed to ORV use and withdrawn from mineral entry. An additional 1,000 acres would be designated NSO for a total of 4,300 acres.

There would be a 40-acre study plot exclosure designated for each of the 41 range sites and one pseudoriparian SHS in different ecological condition classes, for a total of 92 exclosures. Protection of these sites

TABLE 4-9
PROJECTED PUBLIC LAND ACRES BY RANGE SITE
FOR EACH ECOLOGICAL CONDITION AND FORAGE VALUE CLASS[a]

Alternative III -- Protection

Range Site	Ecological Condition (acres)				Forage Value (acres)		
	Excellent	Good	Fair	Poor	Good	Fair	Poor
Southern Desert MLRA 42							
Gravelly							
SD-2			8,847			5,917	2,930
SD-3	5,323	18,278	27,186	27,474	24,576	24,872	28,815
Deep Sand			11,237	38,102	4,137	11,044	34,156
Sandy							
SD-2			16,501	7,487	6,983	9,518	7,487
SD-3			5,505	1,522	591	4,722	1,714
Gyp Hills		1,269	2,975	10,308	2,909	10,151	1,493
Loamy							
SD-2			12,933	7,444	15,494	351	4,532
SD-3		52,222	46,570	41,357	55,174	42,644	42,330
Bottomland							
SD-2		53	768		53	53	715
SD-3			124	6,268		4,371	2,021
Limestone Hills							
SD-2		21	6,547	3,163	2,834	5,944	952
SD-3		132,178	47,236	2,974	154,054	25,358	2,976
Igneous Hills and Mountains		12,495	2,319	2,027	14,814		2,027
Salt Flats		915	4,049	3,134	4,049		4,049
Shallow Sandy	1,465	59,584	50,480		111,064	466	
Gyp Upland	706	871	38,259	23,962	45,323	4,833	13,642
Draw				412		412	
Shallow	1,456	23,959	20,275	2,038	24,301	21,387	2,038
Limy		1,269	4,974	600	4,809	1,435	601
Pseudoriparian[b]		45				45	
Badlands[b]		4,101	7,955	1,652	3,347	5,753	4,608
Subtotal	8,950	307,260	314,740	179,924	474,512	179,276	157,086
Canadian-Pecos Plains MLRA 70							
Limestone Hills		18,507	78,186		79,904	15,577	1,213
Shallow		42	42	1,155	83		1,155
Loamy		1,339	3,340	3,129	2,466	2,213	3,129
Swale		74	1,098		1,172		
Gravelly			3,803	3,002	2,484	2,161	2,160
Shallow Loamy		10,559	2,667		11,925	1,301	
Subtotal		30,521	89,136	7,286	98,034	21,252	7,657
TOTAL	8,950	337,781	403,876	187,210	572,546	200,528	164,743

Source: BLM Las Cruces District Inventory Data, 1982-1983.

Notes: a/Acres reflect only the areas transected during the 1982-1983 inventory.
b/Not a Soil Conservation Service range site; developed by BLM Las Cruces District for this document.

from livestock grazing and surface disturbing activities would provide an undisturbed area that would be useful in establishing trends in vegetation change and provide baseline data that would improve understanding of the ecology of each site (3,680 acres).

Under land tenure adjustment, vegetation on approximately 154,000 acres would be lost from BLM jurisdiction within the Resource Area.

In the process of providing legal access to public land within the Resource Area, vegetation on 327 acres would be lost in the construction of new roads.

Threatened or Endangered Plant Species

Threatened or endangered plant species and their habitat would be further protected under this alternative by reduced livestock grazing intensities. Areas where threatened or endangered plant species occur would be identified and avoided where adverse impacts would occur from rangeland developments and vegetation treatments.

Livestock Grazing

Impacts from proposed rangeland developments include increased livestock grazing pressure around proposed new waters and in a few instances, adjacent to new fences. Impacts resulting from the additional use would be offset by decreased pressure around existing waters and improved livestock distribution. The short-term impacts would be severe; a reduction of 29 percent or 42,234 AUMs below preference. Livestock grazing use would be decreased on all allotments with areas in fair (25 percent) and poor (50 percent) ecological condition. As a result of eliminating livestock grazing on riparian areas around Lake Holloman and adjacent lands (2,520 acres), approximately 199 AUMs would be lost. In the short-term, because of this reduction, vegetation would respond initially but would not return to full grazing numbers in the long-term due to weather factors and increased brush encroachment (Herbel 1982 and Beck 1982). In the long-term, there would be an AUM decrease of 17,801 or 12 percent below the preference to 130,115 AUMs. See Appendix D-9 for carrying capacity and management status by allotment under the Protection Alternative.

There would be a 40-acre study plot exclosure designated for each of the 41 range sites and one pseudoriparian SHS in different ecological condition classes, for a total of 92 exclosures. Protection of these sites from livestock grazing and surface disturbing activities would provide an undisturbed area that would be useful in establishing trends in vegetation change and provide baseline data that would improve understanding of the ecology of each site. Grazing would be eliminated on 3,680 acres, totaling 246 AUMs.

The protection of Lake Holloman and adjacent lands in addition to the riparian area along Percha Creek would provide protection of vegetation and would eliminate livestock grazing on 2,480 acres, totaling 416 AUMs.

Under land tenure adjustment, approximately 154,000 acres would be lost from BLM jurisdiction and 22,581 AUMs would be removed from BLM

authorization within the Resource Area. Grazing fees from these 22,581 AUMs of livestock grazing use would no longer be received. Under this alternative, Section 3 allotments may not be affected while Section 15 allotments have the potential to be affected.

In the process of providing legal administrative and public access to public land within the Resource Area, an additional 48 AUMs would be lost in the construction of new roads.

Wild Burros

In the short-term, wild burro numbers would increase slightly. The slight increase in numbers would be due primarily to an increase in vegetation. The increase in vegetation would result from proposed grazing management treatments and rangeland developments.

In the long-term, wild burro numbers would increase significantly. Herd viability would be increased by relocating a minimum of 38 burros to supplement the existing 12 burros.

All wild burro areas which were inhabited by wild burros in 1971 would continue to be managed as wild burro areas.

There would not be a significant impact to the free movement of wild burros and no action would be taken that would interrupt or change the migration or other movement of the herd.

Wildlife

Standard Habitat Sites (SHS's)

Table 4-3 shows approximately a 24 percent improvement in ecological condition by one condition class. Assuming the same distribution by SHS as shown in Table 4-3, the changes would range from about 46 percent of the acres of the mesquite rolling upland SHS improving by one condition class to only a slight change for the mesquite sand dune SHS.

Fencing of the riparian habitat along Percha Creek would result in an unknown level of improvement in the ecological condition of the site, and should result in an increase in desirable riparian trees, such as cottonwoods.

The majority of acreage identified for land tenure adjustment under this alternative involves mostly SHS's which are abundant and moderate in diversity, such as mixed shrub rolling upland, indicating an insignificant loss of habitat sites under BLM management. An exception is riparian habitats. Riparian habitat, which is less than 1 percent of the habitat sites, would mostly be lost to BLM management under this alternative. Specific riparian sites involved are Percha Creek, Palomas Creek (Southern Rio Grande), Tularosa River, and about 140 other public riparian acres, some of which are located within well-blocked public land. About 220 acres of riparian habitat would be lost to public land management

under this alternative. Almost one-seventh of pseudoriparian habitat would be removed from Federal management also.

Big Game

The largest gain in improvement in ecological condition would be in the good condition class. The average production of preferred browse species increases from almost 10 pounds per acre in the fair ecological condition to almost 18 pounds per acre in the good ecological condition, with most of the increase occurring in the shrub habitat types. Preferred browse species production declines to near zero in the grass habitat types in good ecological condition. There should be an increase in the production of preferred browse species of about 12,000 AUMs. Combined with the presently available AUMs, the increase would be sufficient, with the short-term reduction in livestock numbers, to provide forage for optimum big game numbers. In the long-term, there would not be sufficient production of preferred browse species to provide forage for both big game and livestock.

Under this alternative, habitat for about 5,955 deer and 731 pronghorn (present numbers) would be removed from Federal management. BLM's involvement in the Nutt pronghorn herd unit would be virtually eliminated. The Nutt herd unit has been planned for preparation of a Sikes Act Habitat Management Plan cooperatively with the New Mexico Department of Game and Fish.

Lands on the east side of Elephant Butte Reservoir which are included in the Magdalena deer herd unit and support about 25 deer would also be removed from Federal management. The significance of this action is unclear, but this area represents the only opportunity for public management and use of the Fra Cristobal Mountains, which have been evaluated for reintroduction of desert bighorn sheep and have produced trophy deer.

Small Game

The increase in plant diversity in habitats preferred by scaled quail should increase by about 24 percent. This indicates that scaled quail habitat improvement would provide for an increase in scaled quail. Although inconclusive, the available inventory data indicate there would be a similar amount of improvement in Gambel's quail habitat.

Under this alternative, land tenure adjustment would not have a significant effect on small game. Future use of the transferred riparian and pseudoriparian habitats could result in considerable habitat loss for Gambel's quail.

Waterfowl

The nine proposed earthen stock tanks would provide new habitat for waterfowl. The short-term reductions in livestock grazing would provide improvement in existing waterfowl habitat by reducing the pressure on shoreline vegetation.

Elimination of livestock grazing on 2,520 acres and fencing of about 1,360 acres would provide improved habitat for waterfowl at Lake Holloman and Lake Stinky. Cole et al. (1981) reported that Lake Stinky probably provides more shallow water for wading bird food production than Lake Holloman, although it is only 20 percent the size of Lake Holloman. Elimination of livestock grazing from Lake Stinky may not increase waterfowl food production, but would permit an increase in vegetation around the shoreline, primarily outside the water (or playa) zone.

Threatened or Endangered Fauna Species

Under this alternative, lands where there are records of the occurrence of the McCown's longspur and peregrine falcons would be removed from Federal jurisdiction and protection of endangered species and their habitats.

Recreation

New access associated with proposed rangeland developments would result in a change of 9,000 acres from the SPNM class to the SPM class. This would be a 7 percent reduction in the recreation opportunities associated with the SPNM class and a 2 percent increase in the recreation opportunities associated with the SPM class. The majority of this change would occur in southeastern Otero County. In the long-term, this would result in insignificantly improved recreation access in the affected areas and a slight potential for increased recreational use of the areas. This could increase slightly the interaction between recreational and nonrecreational users.

The impacts on recreation opportunities in the Sacramento Escarpment would be the same as the Balanced Alternative except the increased acreage of the Sacramento Escarpment would provide additional protection for the area's existing recreational and natural values. Withdrawing the ACEC from mineral entry would provide additional long-term protection for dispersed recreation opportunities.

The limited ORV designations for the Three Rivers Petroglyph Site and Picnic Area would protect existing recreation opportunities in the area. The open ORV designations are, in effect, a continuation of the existing situation and would result in continued availability of recreation opportunities to all users and groups. ORV use could increase insignificantly in the long-term.

Visual Resources

Visual contrasts would occur from the structures and surface disturbance associated with the proposed rangeland developments, vegetation treatments, and additional roads.

Although rangeland developments would have a slight overall impact on the area's visual quality, individual projects would result in moderate long-term local impacts depending on locations and visibility of the developments.

Cultural Resources

Under this alternative, trampling would be decreased by 31 percent overall in the short-term with 20 percent in areas in poor condition and 12 percent in areas of fair condition. In the long-term, trampling would be reduced by 10 percent. The decrease in the short-term would have a high impact in decreasing the effects of trampling; however, in the long-term, the decrease would have a low impact in retarding the effects of trampling. The construction of the rangeland developments would result in the locating of 3 sites, assuming 1 site for every 319 acres and 40 acres surveyed for each livestock water.

The increase in wildlife AUMs would lead to an increase in trampling that would have a moderate impact over the long-term. While there is approximately a 50 percent increase, the actual number of animals is not great and they are concentrated in rocky areas where the effects of trampling would be minimized.

The improvement of erosion conditions from severe to moderate on 73,601 acres would have a moderate impact on an estimated 230 sites. The sites would be preserved for a longer period of time, allowing for their study by archaeologists. By limiting ORV use in these areas, the churning of the sites would be decreased as would vandalism. ORV use on McGregor Range north of State Road 506 would have a severe impact on the archaeological resources in Grazing Units 1 and 2 from increased vandalism. Many of the sites in this area are limited to existing roads and if the vandals know that this area is not closed by the military, the vandalism would increase greatly on some of the largest Jornada Mogollon pueblos known.

The fencing of the riparian area along Percha Creek would prevent trampling on any sites present. Based on 1 site per 319 acres, 1 site is predicted. The fencing of 3,680 acres in 92 40-acre parcels would protect from trampling any sites present within the parcel. Based on 1 site per 319 acres, a total of 11 sites are predicted to be enclosed. If the enclosures are selected so as to be placed on significant sites, this proposal could have a significant impact. The elimination of livestock around 2,520 acres of Lake Holloman would protect an anticipated 8 sites. By making the Sacramento Escarpment an ACEC, any sites present would be protected; however, the sites on the escarpment are usually in caves on near vertical slopes that get no impacts from ORV or mining at the present.

The limiting of ORVs to existing roads and trails in the Brokeoff, Cornudas, and Cuchillo Mountains would have a very minor impact on cultural resources because of low ORV use at the present time.

The limitation of ORVs to existing roads and trails at Three Rivers would prevent possible churning, which would be a continuation of the existing situation. By fencing the entire area, trampling would be prevented and the existing fences can be combined into one less visible to the site visitors. By closing Rattlesnake Hill to ORVs and future rangeland improvements, any potential disturbance to a large Jornada Mogollon pueblo would be eliminated. The Alamo Mountain petroglyphs would be protected from

disturbance by closing to ORV use, designation as NSO, and elimination of future rangeland improvements except for maintenance on the existing pipeline. By limiting ORV use on 320 acres around Lone Butte, churning of a major Paleo-Indian site would not occur. Restricting ORVs on 320 acres of the Jarilla Mountains would protect a small Jornada Mogollon pueblo from churning. By limiting major surface disturbance to within 1/4 mile of the center of the well-preserved segments of the Butterfield and Jornada del Muerto Trails, the last remaining tracks of these once important communication routes would be protected.

The land tenure adjustment would involve a number of areas that have known sites or the potential for having high site densities. The lands to the north and east of Pinon probably have a high site density because of their closeness to the forest and major drainages. The lands in the center and southern portions of the mesa do not have enough survey information to make an estimate of the site density. The parcel near Iron Mountain has a good potential for containing sites, especially near Cuchillo Negro. The parcels north and east of Cuchillo Mountain have several known small Mimbres pueblos. The parcels around Chise have several cave sites near the confluence of Monument and Cuchillo Negro Creeks; otherwise, they are very steep and have low potential. The parcel next to North Percha Creek may have a site located in it. The parcels on Trujillo and Tierra Blanca Creeks have a high probability of containing sites; there is a small structural site at McClede Spring and a large pueblo at Tierra Blanca east of Highway 27. The Lake Valley area contains several historic structures. The parcels close to Macho Creek have the potential for containing small Mimbres pueblos; otherwise, the area along the southern end of the Gila National Forest is too rugged for any major sites. The parcel north of Nutt contains some large lithic quarry sites. There is not enough information on the lands north of Alamogordo to Three Rivers to make an adequate assessment of the resources present. Major drainages and springs can be expected to contain sites. The area along the Tularosa River is known to contain very high site density. The parcels bordering the northern boundary of McGregor Range probably have very high site density. Based on 1 site per 319 acres, a total of 484 sites would be located on the 154,000 acres.

The 135 miles of new roads would affect high site density areas on the western site of the Jarilla Mountains and Lone Butte. The principal effect would come from the additional access in areas of high site density. Pothunting and surface collection would increase in areas with better access. Assuming a 20-foot right-of-way, the roads would disturb 6 acres per mile on 133 miles of new roads for a total of 798 acres. Based on 1 site per 319 acres, a total of 2 sites would be located during cultural surveys for the new roads. Any degradation of cultural resources would result in irreversible and irretrievable losses of information.

Social and Economic Conditions

In the short-term, livestock operators would have unfavorable attitudes towards the BLM due to the downward adjustments they would receive. The social well-being of the operators would be threatened, particularly the small cow-calf operation, which would receive the largest decrease of all operators; almost 23 percent of their total herd size.

Ranching, as a lifestyle in general, would be seriously threatened for all operators. However, these downward adjustments in the short-term would be offset for some operators by the development of rangeland improvements, which could cause a shift in attitudes towards the BLM.

Total receipts for all operations would decline by approximately 15 percent to a new level of $2.9 million. (See Table 4-6 for additional information.) Returns to operator labor, management, and capital would decline approximately 20 percent to an estimated level of $388,250. These returns may actually be lower, depending on the total indebtedness of the operators, since a portion of these returns would be used to repay loans. Returns to all small cow-calf operators would decline by 9.7 percent, the medium cow-calf operation would receive a 39.3 percent decrease, and the large cow-calf and medium cow-sheep operations would experience an estimated decrease of 17 percent and 7.1 percent, respectively. (See Table 4-10.) The AUMs available for borrowing purposes would decline by 29 percent to a new value of approximately $10.6 million. Hired ranch labor would decline by 3 jobs from the existing 29 jobs in the Resource Area economy with a corresponding decrease in employee compensation of $20,675. Total employment and employee compensation within the Resource Area economy would decline by 8 jobs and $77,027, respectively.

In the short-term over a period of 10 years, approximately $900,000 would be expended for rangeland developments. The cumulative effect would cause total regional employment to increase by approximately 18 job opportunities and employee compensation would increase by approximately $218,000 or .14 percent of total employee compensation in the Resource Area economy.

In the long-term, the total AUMs for all operations would remain at an overall level below the 5-year average and preference. If operations were able to sustain the short-term adjustments, the profitability of their operations would increase by 41.2 percent from the short-term and would be above existing levels by 12.6 percent. Total receipts for individual small cow-calf operations would decline by 10.4 percent to a new estimated level of $15,175. The medium cow-calf operation would decline by 6.3 percent to $52,968, and the large cow-calf operation would decline by 4.5 percent to $238,356. The medium cow-sheep operation would experience an increase of 5.3 percent in total receipts to $113,458. These adjustments are compared to existing ranch budget levels. Hired ranch labor would recover from the short-term decline of 3 jobs to the existing level of 29 jobs.

Total employment and employee compensation in the regional economy would not be altered significantly.

Total AUMs available for borrowing purposes would decline by approximately 12 percent below preference to a new value of $13 million, assuming a 1982 AUM value of $100.

There is a possibility that miner, rancher, and hunter inconveniences could occur due to the restrictive ORV management actions, thus affecting their attitudes.

TABLE 4-10
ESTIMATED ANNUAL COSTS AND RETURNS FOR INDIVIDUAL BLM RANCH OPERATIONS FOR OTERO COUNTY, 1982

Protection Alternative

Budget Items	Short-Term				Long-Term			
	Small Cow-Calf 75 AUs	Medium Cow-Calf 253 AUs	Large Cow-Calf 944 AUs	Medium Cow-Sheep 500 AUs	Small Cow-Calf 90 AUs	Medium Cow-Calf 295 AUs	Large Cow-Calf 1,036 AUs	Medium Cow-Sheep 546 AUs
Total Receipts	12,429	44,851	217,294	102,379	15,175	52,968	238,356	113,458
Variable Costs	7,338	23,748	105,354	33,292	8,959	28,045	115,565	36,895
AUM Costs	2,235	5,471	18,056	8,704	2,571	6,405	20,117	9,742
Returns Above Variable	2,856	15,632	93,884	60,383	3,645	18,518	102,674	66,821
Fixed Costs[a/]	2,132	3,472	14,396	7,047	2,132	3,472	14,396	7,047
Depreciation[a/]	5,322	11,009	25,041	21,163	5,322	11,009	25,041	21,163
Returns to Operator Labor, Management, and Capital	-4,598	1,151	54,447	32,173	-3,809	4,037	63,237	38,611

Source: BLM Las Cruces District Office Files, 1984.

Note: a/Fixed costs and depreciation are assumed to remain constant.

In the long-term, if the 154,000 acres that have been identified for land tenure adjustment are successfully disposed of at estimated current fair market value (see Appendix I-4), then these lands would be valued at approximately $15.4 million. Actual valuation would be determined by site-specific appraisals. Assuming land values would not be affected by the disposal of 154,000 acres of public land and assessed valuation at 33.3 percent of estimated value, the sale of the total acres could add $5.1 million or 2.2 percent to the total assessed valuation ($232.9 million) of the Resource Area economy. Estimated potential tax revenues would be $82,238. The estimated Resource Area economy receipt of payments in lieu of taxes would not be affected.

In the long-term, if the 154,000 acres identified for land tenure adjustment are sold to private parties, the private ownership in the Resource Area would increase by approximately 17.1 percent. Lands that would be provided for community expansion and public purposes would benefit those individual communities acquiring the lands economically and socially. The economic benefit would be receipt of the use of the lands through the issue of a Recreation and Public Purposes Permit at favorable terms. The social benefit would be a favorable change in the general attitudes toward the BLM from the population receiving the benefits from the land use.

If the lands were exchanged with the State of New Mexico, there is the possibility that current users of public land may incur inconveniences of the use of these lands after the exchange occurs. Depending on the State regulations regarding different uses, these inconveniences may cause negative economic effects and a corresponding decrease in the attitude of the users towards the BLM.

The construction and maintenance of 135 miles of new roads would inject approximately $3.9 million into the Resource Area economy. This would have a positive economic effect, especially within those small communities near construction of these roads.

Alternative IV -- No Action

Soils

Under the No Action Alternative, current livestock use would continue. Medium and fine textured soils would continue to be compacted around water facilities, cattle trails, and other areas where livestock concentrate. Compacted soils lower the infiltration rate of water, causing higher rates of runoff from these areas. Gullying and increased soil loss result from runoff water collecting in cattle trails and flowing down slopes. Wind erosion would decrease slightly on loamy and sandy textured soils where vegetation condition and ground cover improves. Impacts to soils resulting from livestock grazing would be minor or confined to small areas; therefore, impacts would not be significant to the erosion condition of the WSRA.

Public land undesignated for ORV use under the No Action Alternative would be susceptible to compaction by ORVs, especially when

wet. ORVs form ruts on wet soils and destroy vegetation, leaving these areas susceptible to the formation of gullies. Gravelly and cobbly soils typical of hilly terrain also become susceptible to accelerated erosion if soil structure is altered by vehicles' tires spinning and loosening soils when travelling up hills. New State laws currently regulate hunters driving off-road, which eliminates some of the impacts which have occurred in previous fall hunting seasons when hunters concentrate in certain areas of the Resource Area. Recreational ORV activity would continue around populated areas, causing long-term irretrievable loss of soils, but the increases in erosion rates resulting from ORVs would be insignificant in the Resource Area.

No new roads would be proposed by the BLM under this alternative, but easements for legal access would be acquired as needed on non-Federal lands. Soils would be eliminated from production of vegetation where new roads were built.

Water Resources

No significant changes from the existing situation would occur concerning water quality and water use. Peak runoff rates would remain high on key range sites. Some improvement of watershed condition would occur from site-specific watershed treatments, but as a whole, there would be no significant change.

Since no new special management areas would be designated, there would be no significant change from the existing situation.

Vegetation

Under the No Action Alternative, no proposed changes in management by BLM in direct support of livestock grazing would occur. Livestock distribution and grazing patterns on most allotments would remain unchanged. Yearlong grazing would continue. Preferred forage species would continue to be heavily utilized every year. Uneven distribution patterns could continue. Areas closest to water would be heavily used. Improvement due to light grazing intensity would increase with the distance from water.

Cattle graze the best forage plants on the most accessible parts of the range 365 days a year (Martin 1966). Productive areas of the rangeland under this nonmanagement situation become less productive. Less desirable species would invade these depleted areas. Because annual growth is so dependent on rainfall which is so variable, perennial species would have increased livestock grazing pressure in years of low annual production. Increased livestock grazing pressure would reduce the vigor and density of competing perennials.

Any improvement in rangeland condition would result from climatic condition changes and improved management practices by operators. Extended periods of average or below average precipitation would result in deteriorating rangeland condition. Periods of above average growing season rainfall would result in a temporary improvement in rangeland condition.

Since these above average periods occur 1 out of 3 years or 2 out of 10 years, no permanent improvement of rangeland condition would occur.

The projected long-term changes in the number of acres in each ecological condition and forage value class as a result of changes in species composition are shown in Table 4-11. The number of acres in poor ecological condition would increase from 413,005 to 434,829 and in fair ecological condition from 386,596 to 433,242. The number of acres in good ecological condition would decrease from 138,216 to 69,746. There are no acres in excellent ecological condition. The number of acres in the good forage value class would decrease from 422,239 to 328,414. Acres in the fair forage value class would increase from 252,401 to 335,345 and in poor forage value class from 263,177 to 274,058. Acres in ecological condition and forage value classes would change due to the lack of grazing management treatments, vegetation treatments, and rangeland developments.

Threatened or Endangered Plant Species

The impacts to threatened or endangered plant species would be the same as the existing situation. Disturbance of plant species and their habitat where the plants are affected by grazing activities would decrease or increase according to grazing intensities.

Livestock Grazing

In the long-term, initial livestock grazing use under the No Action Alternative would decrease due to increased deterioration of rangeland condition, trend, and perennial forage production. Deterioration would be gradual; however, impacts from reduced livestock numbers on a voluntary basis could eventually be significant. No major adjustment would be needed in the long-term. See Appendix D-9 for carrying capacity and management status by allotment under the No Action Alternative.

Since southern New Mexico vegetation patterns have changed significantly within the last 100 years, it is assumed that present patterns would continue changing to brush-dominated areas without some vegetation treatment. Desirable perennial forage species would have a small chance for recovery (Beck 1982; Herbel 1982; Norton 1981; and York and Dick-Peddie 1969).

Wild Burros

Continuing present management would not significantly affect the wild burro population. The herd size would remain essentially unchanged. This would not be a significant short- or long-term impact. No action would be taken that would interrupt or change the migration or other movement of the wild burros.

Wildlife

Standard Habitat Sites (SHS's)

Under this alternative, ecological condition would decline by 1 condition class on approximately 7 percent of the Otero County area. The

TABLE 4-11
PROJECTED PUBLIC LAND ACRES BY RANGE SITE
FOR EACH ECOLOGICAL CONDITION AND FORAGE VALUE CLASS[a/]

Alternative IV -- No Action

Range Site	Ecological Condition (acres)				Forage Value (acres)		
	Excellent	Good	Fair	Poor	Good	Fair	Poor
Southern Desert MLRA 42							
Gravelly							
SD-2				8,847			8,847
SD-3			26,952	51,310	19,464	7,923	50,875
Deep Sand				49,338		8,082	41,256
Sandy							
SD-2				23,988	8,443	570	14,975
SD-3				7,027	591		6,436
Gyp Hills			1,562	12,991		13,314	1,239
Loamy							
SD-2				20,377	8,572	7,273	4,532
SD-3		3,232	57,471	79,446	25,982	31,003	83,164
Bottomland							
SD-2			820			105	715
SD-3				6,392		4,172	2,220
Limestone Hills							
SD-2			4,358	5,373	624	8,155	952
SD-3		57,719	106,940	17,729	91,378	80,927	10,083
Igneous Hills and Mountains			12,495	4,346	6,788	8,026	2,027
Salt Flats			2,167	5,931	5,688	2,410	
Shallow Sandy		831	108,797	1,901	106,362	4,236	931
Gyp Upland			1,336	62,463	4,470	46,299	13,030
Draw				412		412	
Shallow			38,850	8,876	165	38,689	8,872
Limy			3,974	2,869	3,974	1,670	1,199
Pseudoriparian[b/]			45				45
Badlands[b/]			8,202	5,507	2,202	2,290	9,217
Subtotal		61,782	373,969	375,123	284,703	265,556	260,615
Canadian-Pecos Plains MLRA 70							
Limestone Hills		3,874	49,168	43,652	34,565	59,702	2,427
Shallow			83	1,155	83		1,155
Loamy		224	1,350	6,234	1,574	892	5,342
Swale			74	1,098	74	1,098	
Gravelly			802	6,003	802	1,682	4,321
Shallow Loamy		3,866	7,796	1,564	6,613	6,415	198
Subtotal		7,964	59,273	59,706	43,711	69,789	13,443
TOTAL		69,746	433,242	434,829	328,414	335,345	274,058

Source: BLM Las Cruces District Inventory Data, 1982-1983.

Notes: a/Acres reflect only the areas transected during the 1982-1983 inventory.
b/Not a Soil Conservation Service range site; developed by BLM Las Cruces District for this document.

changes would occur primarily on the rolling upland habitat types (4.8 percent), including grass rolling upland. This indicates that shrub species composition would increase and that grass species would decline. Shrub-associated animal species would increase, while grassland-associated species would decline. Data on Table 4-3 indicate that species diversity would decline, although perhaps an imperceptible amount. Not designating Percha Creek for special management would not provide for improvement in this important riparian area.

Lake Holloman would be subject to abuse, including livestock grazing, of shoreline habitat where waterfowl reproductive success has already been determined to be low (Cole et al. 1981).

Big Game

The ecological condition decline mentioned for SHS's above would imply (Table 4-3) that there would be a decline in the availability of preferred browse species. The decline in preferred browse species would result in a small decline in both deer and pronghorn numbers. Habitat would not be available to produce optimum numbers of big game animals, which may be necessary to meet hunter demand.

Small Game

A slight decrease (7 percent) in game bird populations would probably occur with a decline in ecological condition.

Cultural Resources

Under the No Action Alternative, the impact to cultural resources would remain the same as at present. The primary impact comes from the breakage and movement of artifacts caused by trampling. Although it is most severe in areas of high livestock concentration, there is a variable degree of impact wherever livestock grazing occurs depending upon the number of livestock and the soils involved. The trampling caused by wildlife is similar to that caused by livestock. Since the deer are concentrated in mountainous areas, they would probably cause less damage from erosion and churning. The burro herd is too small to cause appreciable damage.

The ORV use of the area would continue as at present. Over 20 years, ORV use near populated areas would increase, especially in the area between Highway 54 and White Sands Missile Range. The impact of ORVs is caused by the churning of the wheels leading to the displacement of artifacts. In addition ORVs allow individuals access to sites that are not accessible with regular vehicles, this can cause increased vandalism.

The land tenure adjustment program would result in the location of approximately one site a year through survey prior to disposal. Those sites would be mitigated or not disposed. Any degradation of cultural resources would result in irreversible and irretrievable losses of information.

Social and Economic Conditions

Under this alternative, it is assumed there would be no major adjustments in livestock grazing. (See Table 4-12.) Therefore, total receipts for livestock operations would not be adversely affected. Total receipts would approximate the 1982 figure of $3.4 million. (See Table 4-6.) Total personal income for the Resource Area economy would remain at approximately $374 million. Total employment would not significantly change from 15,400 job opportunities in the Resource Area economy due to this alternative.

TABLE 4-12
ESTIMATED ANNUAL COSTS AND RETURNS
FOR INDIVIDUAL BLM RANCH OPERATIONS FOR OTERO COUNTY, 1982

No Action Alternative[a/]

Budget Items	Small Cow-Calf 97 AUs	Medium Cow-Calf 304 AUs	Large Cow-Calf 1,079 AUs	Medium Cow-Sheep 520 AUs
Total Receipts	16,942	56,505	249,678	107,728
Variable Costs	10,955	33,527	123,686	35,728
AUM Costs	2,726	6,602	21,080	9,155
Returns Above Variable Costs	3,261	16,376	104,912	62,845
Fixed Costs[b/]	2,132	3,472	14,396	7,047
Depreciation[b/]	5,322	11,009	25,041	21,163
Returns to Operator Labor, Management, and Capital	-4,193	1,895	65,475	34,635
Number of Operators	34	13	5	8

Source: BLM Las Cruces District Office Files, 1984.

Notes: a/The No Action Alternative in the short-term and the long-term is the same as the existing situation.
b/Fixed costs and depreciation are assumed to remain constant.

The economic structure of the Resource Area economy would not be affected. Total employment and income would remain unchanged. Any changes that would occur would not be due to factors related to actions under the No Action Alternative.

The demographic characteristics would not undergo any major changes in the Resource Area. The general population would not be

significantly affected. The social well-being of the general population and the ranching population would remain as present, with no major changes in the infrastructure occurring. The lifestyles which characterize the ranching way of life would not undergo any major changes. The social values of living in the area would not be affected under this alternative.

Residents of the Resource Area (Otero and Sierra Counties) as well as nonresidents would continue to seek recreation opportunities such as big game hunting, small game hunting, rockhounding, and motorized recreation. While enjoying these recreation opportunities, local expenditures are made by these users for goods and services, thus contributing to the local economy. It should be mentioned that many nonresident major expenditures are made outside the local economy. On occasion, nonresident users do not make any local expenditures.

Since public land would continue to be undesignated for ORV use, conflicts between hunters, recreationists, miners, and ranchers could occur. The attitudes of these users towards the BLM could decline, especially if the conflicts are difficult to resolve.

The land tenure adjustment proposals that are estimated to be processed annually (approximately 100 acres) or the access proposals within the Resource Area would not significantly affect the structure of the economy nor the social characteristics.

Alternative V -- No Livestock Grazing

Access

If livestock grazing were eliminated from public land, additional road construction and acquisition of road easements would not be necessary because there would be no need to administer grazing regulations on these lands. The impact of this action on access would be low.

Increasing mule deer and pronghorn numbers may increase the need for public access to areas where access has been specifically asked for by hunters. To obtain the access, easements across existing non-Federal roads would be needed.

Geology and Minerals

The removal of livestock grazing from public land and the subsequent loss of "de facto" jurisdiction over these lands claimed by some permittees could have a small effect on the exploration for and development of mineral resources. The overall impacts would be insignificant.

Soils

Under the No Livestock Grazing Alternative, all livestock would be removed from public land. All further livestock-related impacts to soils would be eliminated. No further livestock trailing and soil compaction by trampling would occur. Further disturbance to soils resulting from the installation of livestock-related rangeland developments would not occur.

Soil erosion by water would decrease on sites where runoff is reduced as a result of improved vegetation cover. The average 18 percent reduction in runoff on key range sites would result in an estimated 20 percent reduction in soil loss, depending on the particular range site and soil type. Wind erosion susceptibility would also decrease slightly in some areas, but there would be no change in the wind erodibility groups of the soils.

Under the No Livestock Grazing Alternative, 73,601 acres would be considered for watershed treatments. The treatments would improve erosion condition of the watersheds by eliminating further headcutting, improving soil stability, increasing vegetation ground cover, and decreasing soil loss. Common watershed rehabilitation practices include gully plugs and rock check dams for stabilizing headcuts, wire checks, and spreader dikes for more efficient use of runoff water, and reseeding for improved vegetation ground cover. The improved condition would be confined to small areas and thus would not be significant to the total erosion condition of the WSRA.

Soil erosion by water would decrease slightly where vegetation condition and ground cover are improved, but overall, sediment yields would not change significantly. Wind erosion susceptibility would also decrease slightly, but there would be no change in the wind erodibility groups of the soils.

Water Resources

Peak runoff rates on key range sites would decrease an average of 18 percent in the long-term where vegetation cover increases a minimum of 5 percent. (See Appendix B-1 for more detailed information.)

Reduced runoff would cause a decrease in dissolved solids and suspended sediments that would otherwise be transported by runoff water; however, amounts cannot be quantified at this time. Surface water quality would also improve through decreases in stream bank erosion and reduced fecal coliform count. As ungrazed areas improve and runoff decreases, both overland flow velocities and quantities would be reduced, peak discharge would be lowered, and on-site utilization of water would be improved. Ground water quality would not be affected under this alternative.

Water consumption of 165 acre-feet per year by livestock would be eliminated, while wildlife would consume 2 acre-feet per year in the long-term. Total water depletion in the long-term would be 216 acre-feet per year, which would be an irretrievable loss of the resource. Earthen stock tank evaporation would not be a quantifiable change from the existing situation. Water consumption by wild burros would increase slightly to 1 acre-foot per year.

Under the No Livestock Grazing Alternative, watershed values would be enhanced in the long-term on 73,601 acres proposed for watershed treatments. The objectives of watershed treatments include a reduction in peak runoff rates, a reduction in sediment yield, improved water quality,

and better on-site utilization of runoff water. Future management plans would be tailored to meet these objectives.

Vegetation

Under the No Livestock Grazing Alternative, vegetation response would vary according to range site, vegetation subtype, and condition class. The vegetation resource would still be governed by climatic conditions and soils limitations. Some plant communities would probably not improve through natural processes. Drought in the semiarid desert region is not uncommon. Black grama, one of the preferred forage species, was reduced by 38 percent and, in some cases, eliminated between 1916 and 1934. From the 1951-1956 drought, this species was reduced 1 to 50 percent depending on the soil type (Herbel and Gould 1980).

Blydenstein et al. (1957) indicate the most notable change under protection was an overall increase in the density of the vegetation, although most of the same species occurred on both the protected and unprotected areas. With increased vegetation densities come increased litter accumulations. Fire damage and danger could increase. With more fuel, fires would be hotter, causing more damage to the existing site. Fire-tolerant species would increase.

By excluding livestock grazing, positive results from grazing would not be realized. Some of the effects of managed livestock grazing are: loosening of soil surface during dry periods; incorporation of mulch into the soil profile to speed humus development; nutrient recycling and increased availability in the ecosystem; trampling of seeds into the soil; reduction of excess accumulation of standing dead vegetation material which chemically and physically inhibits new growth; inoculation of plant parts with saliva to stimulate regrowth; or reduction of fire, insect, and rodent problems associated with vegetation accumulation (Holechek 1981). Proper grazing stimulates plant growth in many cases (Stoddart et al. 1975).

The projected changes in the number of acres in each ecological condition and forage value class as a result of changes in species composition are shown in Table 4-13. The number of acres in good ecological condition would increase from 138,216 to 448,499 and decrease in fair ecological condition from 386,596 to 337,099 and in poor ecological condition from 413,005 to 152,219. The number of acres in each forage value class would increase in good from 422,239 to 609,214 and decrease in fair from 252,401 to 185,831 and in poor from 263,177 to 142,772.

Threatened or Endangered Plant Species

Adverse impacts to threatened or endangered plant species and their habitat from livestock grazing would be removed. Any beneficial impacts favoring the growth and reproduction of these species also would be removed.

TABLE 4-13
PROJECTED PUBLIC LAND ACRES BY RANGE SITE
FOR EACH ECOLOGICAL CONDITION AND FORAGE VALUE CLASS[a]

Alternative V -- No Livestock Grazing

Range Site	Ecological Condition (acres)				Forage Value (acres)		
	Excellent	Good	Fair	Poor	Good	Fair	Poor
Southern Desert MLRA 42							
Gravelly							
SD-2			8,847			8,847	
SD-3		20,420	24,962	32,880	25,234	17,434	35,594
Deep Sand			22,281	27,057	8,082	14,199	27,057
Sandy							
SD-2			23,988		4,953	19,035	
SD-3			6,143	884	591	4,576	1,860
Gyp Hills		1,562	5,365	7,626	4,842	9,261	450
Loamy							
SD-2			15,845	4,532	15,845		4,532
SD-3		52,632	48,163	39,354	54,552	41,545	44,052
Bottomland							
SD-2		105	715		105		715
SD-3				6,392		4,324	2,068
Limestone Hills							
SD-2		21	8,758	952	5,045	3,734	952
SD-3		163,694	15,720	2,974	171,401	8,013	2,974
Igneous Hills and Mountains		12,495	2,319	2,027	14,814		2,027
Salt Flats		1,830	6,268		8,098		
Shallow Sandy		109,518	2,011		110,598	931	
Gyp Upland			38,816	24,983	43,570	4,311	15,918
Draw				412		412	
Shallow		32,921	14,805		30,525	17,201	
Limy		1,576	5,267		5,644	1,199	
Pseudoriparian[b]		45				45	
Badlands[b]		8,202	5,507		4,492	9,217	
Subtotal		405,021	255,780	150,073	508,391	164,284	138,199
Canadian-Pecos Plains MLRA 70							
Limestone Hills		30,085	66,609		81,590	12,677	2,427
Shallow		83		1,155	83		1,155
Loamy		1,574	5,243	991	2,466	4,351	991
Swale		74	1,098		1,172		
Gravelly			6,805		2,484	4,321	
Shallow Loamy		11,662	1,564		13,028	198	
Subtotal		43,478	81,319	2,146	100,823	21,547	4,573
TOTAL		448,499	337,099	152,219	609,214	185,831	142,772

Source: BLM Las Cruces District Inventory Data, 1982-1983.

Notes: a/Acres reflect only the areas transected during the 1982-1983 inventory.
b/Not a Soil Conservation Service range site; developed by BLM Las Cruces District for this document.

Livestock Grazing

With the elimination of livestock grazing on public land, many livestock operators would be forced to liquidate, disperse their livestock, or obtain other lands for grazing to remain in business.

Wild Burros

In the short-term, wild burro numbers would increase slightly in response to vegetation moving toward the desired level of management. In the long-term, wild burro numbers would be increased to 50 head. With the increase in available forage, wild burros would have ample forage which would exceed each animal's individual needs for nutrition. Lack of additional fence construction and discontinued maintenance of many existing fences would ensure freedom of burro movement within traditional home ranges.

Wildlife

Standard Habitat Sites (SHS's)

Approximately 63 percent of the habitat sites in each SHS which are now in poor ecological condition would improve to fair (approximately 260,000 acres) and 21 percent of the habitat sites now in fair ecological condition would improve to good. Table 4-3 shows that for most categories (mammals, plants, etc.), diversity increases with increasing ecological condition. Also, there is a significant increase in percent composition of preferred browse species in good ecological condition, but a decrease in composition of preferred browse species between poor and fair ecological condition. There would be a decline of about 7 percent in the overall composition of preferred browse species.

Big Game

Although the percent composition of preferred browse species would decline, the average production of preferred browse species across all habitat sites increases from 7.08 pounds per acre in poor ecological condition to 9.58 pounds per acre for fair ecological condition to 17.48 pounds per acre for good ecological condition. This means that all forage produced by preferred browse species would be available for big game with none being utilized by livestock, and that total preferred browse production would increase from a present estimate of 18,327 AUMs to approximately 35,000 AUMs, or enough forage to provide for big game populations in excess of optimum. Most of the increased production would be in the shrub habitats and would support more than optimum numbers of mule deer. The inventory data indicate a decline in production of preferred browse species in grass type habitats with improving ecological condition. Production declines to zero in grass hill, grass flats, and mixed shrub rolling uplands in good ecological condition imply that pronghorn would decline when reduced amounts of browse are available.

Waters would no longer be maintained for livestock on public land. Livestock waters are also apparently important to big game. The

number and distribution of livestock waters which would continue to be maintained on private land is unknown. Where public land is well-blocked, livestock waters would probably no longer be maintained. Habitat Management Plans (HMPs) prepared for big game herd units would address water needs for big game.

Small Game

The general trend toward increased plant diversity (Table 4-3) as ecological condition improves indicates that game birds would increase. An increased production of preferred browse species should provide substantial benefits to Gambel's quail in the pseudoriparian habitat and the decline of shrubs and presumed concurrent increase in grasses and forbs in the grass and rolling upland habitat sites should benefit scaled quail.

Nongame

Generally, those species associated with lower ecological condition and invader/increaser shrub species would decline while those species associated with higher ecological conditions and grassland would increase.

Waterfowl

Waterfowl would have better cover and food in the form of improved shoreline vegetation around aquatic habitats. However, in the long-term, available habitat would decrease as silt fills earthen stock tanks, dams are damaged, and no maintenance is performed.

Fisheries

The small amount of fisheries in the area would benefit by a decrease in siltation as ecological condition improves.

Recreation

The elimination of livestock grazing would increase recreation opportunities. The removal of livestock and any rangeland developments would reduce conflicts between recreationists and livestock management.

Except for the following, existing recreation opportunities would continue to exist in a more natural environment. In the long-term, reduced maintenance on existing roads could reduce access for all recreation activities. This could result in increased nonmotorized recreation opportunities throughout the area in the long-term.

Upland game hunting and viewing opportunities would increase slightly in the long-term. Waterfowl hunting and viewing opportunities would increase slightly in the short-term and then decrease slightly as water sources were abandoned or silted in. Deer hunting and viewing opportunities would increase significantly while pronghorn hunting and viewing opportunities would decrease moderately in the long-term.

Visual Resources

Removal of any existing rangeland developments would reduce some of the local visual contrasts which result from rangeland developments and increase slightly the apparent naturalness of portions of the area in the long-term.

Although slight, there would be a visually noticeable increase in spring flowers, vegetation diversity, and the vigor and height of grasslands in the long-term.

Wilderness

No new rangeland developments would be constructed for livestock in WSAs and existing developments which serve no useful purpose could be removed from WSAs. In the long-term, this could improve the scenic and natural qualities of the WSAs. Reduced vehicular use on existing boundary and access routes would improve opportunities for solitude and primitive forms of recreation within the WSAs.

The improved vegetation diversity, vigor, and height would further increase the apparent naturalness of the WSAs in the long-term.

Cultural Resources

Under this alternative, the impacts of livestock grazing on cultural resources would be eliminated. The breakage of artifacts and churning of sites would cease. There would be an increase in trampling caused by deer; however, they live in rocky areas where trampling causes less damage. The decrease of erosion would reduce damage to sites located in the areas of decreased erosion. The small increase in the wild burro herd would not be significant.

Social and Economic Conditions

Implementation of this alternative would result in the loss of 147,916 AUMs on public land over a 5-year period. This would cause significant detrimental changes to the ranching population. Those ranching operations that are heavily dependent on public land would be severely affected. The social well-being of these operators would be lowered and many would lose their role and identity as "rancher." Ranching as a lifestyle would be seriously threatened for many ranchers and ranch hands. Their psychological well-being would be diminished and for many, a part of their heritage would be lost.

The existing herd sizes for the various operations would decline. All operations would be reclassified from their existing size operation to the next lower classification. The small cow-calf operation would become a subsistence size operation, the medium cow-calf operation would become a small cow-calf operation, etc. This would force the operators to employ different ranch management practices.

In general, the small cow-calf operation would change from 97 AUs to 33 AUs. The medium cow-calf operation would decline from the current level of 304 AUs to 109 AUs and the large cow-calf operation would change from 1,079 AUs to 400 AUs. The medium cow-sheep operation would change from 520 AUs to 205 AUs. (See Table 4-14.) This discussion merely indicates what could occur to the average ranching operation in general only, and does not imply what would occur to specific ranch operations for each size.

TABLE 4-14
ESTIMATED ANNUAL COSTS AND RETURNS
FOR INDIVIDUAL BLM RANCH OPERATIONS FOR OTERO COUNTY, 1982

No Livestock Grazing Alternative

	Short-Term			
Budget Items	Small Cow-Calf 33 AUs	Medium Cow-Calf 109 AUs	Large Cow-Calf 400 AUs	Medium Cow-Sheep 205 AUs
Total Receipts	4,765	16,815	93,278	32,127
Variable Costs	2,813	8,903	45,225	10,448
AUM Costs	1,295	2,246	5,921	2,123
Returns Above Variable Costs	657	5,666	42,132	19,556
Fixed Costs a/	2,132	3,472	14,396	7,047
Depreciation a/	5,322	11,009	25,041	21,163
Returns to Operator Labor, Management, and Capital	-6,797	-8,815	2,695	-8,654

Source: BLM Las Cruces District Office Files, 1984.

Note: a/Fixed costs and depreciation are assumed to remain constant.

Overall, total receipts would be reduced by $2.3 million in the long-term. (See Table 4-6.) In the short-term, there would be a temporary increase in livestock sales and income as herds would be diminished and livestock sold. This temporary increase in livestock sales would not last longer than 5 years after the initial decision regarding reductions goes into effect.

Total receipts for the individual small, medium, and large cow-calf and medium cow-sheep operations would change to $4,765, $16,815, $93,278, and $32,127, respectively. (See Table 4-14.)

All operations, except for the large cow-calf, would incur negative returns after fixed costs and depreciation costs are met. (See

Table 4-14.) In addition to these costs would be outstanding long-term payment loans, thus affecting the profitability of the operation. The elimination of 147,916 AUMs would result in a loss of approximately $14.8 million in BLM grazing permit values and a corresponding decrease in the financial flexibility of the rancher.

The livestock operators rely on BLM rangeland for 67 percent of their vegetation requirements. This alternative would leave permittees who wish to remain in business with the option of either reducing herd sizes or acquiring additional forage. Additional forage could be obtained through the purchase or lease of additional private acreage, the purchase of hay, or the intensification of production on currently-owned acreage.

Private land presently owned, leased, or available for leasing would not be adequate to maintain existing herd sizes due to the high percentage of land in the area under public ownership. Consequently, herd size reductions or the purchase of hay are the only feasible options available to ranch operators in the area. In addition, if the operators choose to remain in business, an additional cost of fencing would be incurred to fence public land out of their operations.

Due to the costs imposed by either of these options, a number of operators are likely to be forced out of business. No quantification of this group is possible due to the myriad of variables involved. It is likely, however, that those operations which have employed the highest level of debt financing, those which have the highest degree of dependency on BLM vegetation, and those which command the smallest reserves of capital would be most severely affected.

Many operators have stayed in the livestock business despite relatively low rates of return due to the lifestyle included. This alternative would force reevaluation of the tradeoff between further income reduction and lifestyle retention. This alternative would undoubtedly cause some ranchers to halt their livestock operations and could cause others to cease their reliance on ranching as a primary source of income. Some livestock operators and ranch hands would leave the livestock industry and seek nonranch jobs and other sources of income. Some operators and their families and ranch hands may relocate to find suitable employment elsewhere.

Those directly employed in ranching would experience a decrease of 20 job opportunities which is a 69 percent decrease in employment for direct ranch employment. This amounts to a decrease in ranch hand salaries of approximately $138,000. Employment in the Resource Area economy would decline by approximately 41 jobs and employee compensation would decline by $394,000. Small general stores in the area which depend somewhat on income derived from ranching would be affected.

CHAPTER 5

PUBLIC PARTICIPATION AND COORDINATION

CHAPTER 5
PUBLIC PARTICIPATION AND COORDINATION

INTRODUCTION

This Resource Management Plan/Environmental Impact Statement (RMP/EIS) was prepared by an interdisciplinary team of resource specialists from BLM's White Sands Resource Area and the Las Cruces District. A list of persons involved in preparation of the RMP/EIS is provided in Table 5-1. In the course of preparing this document, formal and informal efforts have been made to involve the public, other Federal agencies, and State and local governments in the planning process. Several points of public involvement are mandated by regulations and were complied with, but numerous other actions were taken to further involve the public.

PUBLIC PARTICIPATION

The planning process began in August 1983 with publication of a Notice of Intent to prepare a Resource Management Plan and invitation to participate in the identification of issues in the Federal Register (Volume 48, No. 164, Tuesday, August 23, 1983, pages 38313-38314).

From August 1983 to September 1984, six newsreleases referring to the planning process were printed in various Statewide media. In addition, the plan was highlighted in two issues of the District newsletter sent to a mailing list of over 800.

On November 1, 1983, a booklet was sent to approximately 700 individuals, agencies, units of local government, organizations, and members of private industry. Included in the booklet was a brief overview of the planning process as well as a description of management and resource concerns which had been identified by the BLM. The public was asked to look carefully at the issues described in the booklet and present their comments to the District by November 30, 1983. A postage-paid comment/response form was provided with the booklet for the convenience of those who wanted to respond. Eight letters were received by the District in response to the call for comment. The letters included three from government agencies, three from private industry, and two from organizations. In response to the booklet, 45 individuals, groups, or agencies returned the comment form with official comments. Thirty-six returned the form with no comment, but indicated a desire to remain on the mailing list. Four returned the form requesting that they be removed from the mailing list.

In addition to sending the booklet, the District held two public meetings. The first was on November 8, 1983, at the Media Center, New Mexico School for the Visually Handicapped, Alamogordo, New Mexico. The second was on November 9, 1983, at the Convention Center, Truth or

TABLE 5-1
LIST OF PREPARERS

Name	RMP Responsibility	Education	Experience
Willis M. Bird, Jr.	Team Leader	B.A., Wildlife Management New Mexico State University	BLM 13 yrs. - Multi-Resources Staff Chief District Wildlife Biologist Resource Area Wildlife Biologist Recreation Technician
Bill Gilbert	Technical Coordinator	B.S., Biology University of Nebraska	BLM 8 yrs. - Natural Resource Specialist
Konnie Andrews	Geology and Minerals	B.A., Geology Trinity University	BLM 4 yrs. - Geologist Core Laboratories Inc. 3 yrs. - Geologist
Bruce G. Call	Soils	B.S., Agriculture (Range and Soil Science) New Mexico State University	BLM 6 yrs. - District Soil Scientist Range Conservationist Range Technician USFS 6 mos. - Soil Technician Forestry Technician
Ira Craig	Lands, Access	B.A., English University of Maryland Professional Resource Management (Lands) Phoenix Training Center	BLM 4 yrs. - Realty Specialist
Maria Isabel Diaz	Cartographer	Las Cruces High School	BLM 2 yrs. - Cartographic Aid Clerk Planning Aid
Ben Fish	Chapter 2--Visual Resources, Recreation Recreation Opportunity Spectrum	M.S., Recreational Resources Development Texas A&M University B.S., Recreation and Park Administration Eastern Kentucky University	BLM 4 yrs. - Budget Analyst Outdoor Recreation Planner
Rena Gutierrez	Writer-Editor	B.A., Journalism/Mass Communications New Mexico State University	BLM 6 yrs. - Writer-Editor Clerk-Typist Public Information Aid
Steven C. Hamp	Water Resources	M.S., Watershed Management University of Arizona B.S., Geology and Sociology Illinois State University	BLM 6 yrs. - District Hydrologist USFS 2 yrs. - Forest Technician
Kimberly A. Harrison	Editorial Assistant	1 Semester - Art University of Texas at El Paso 2 Semesters - Biology Texas Lutheran College	BLM 5 yrs. - Editorial Assistant (Typing) Planning Clerk (Typing) Clerk-Typist El Paso Community College 4 yrs. - Secretary II Accounts Payable File Clerk Night Cashier/PBX Operator Registration Cashier

TABLE 5-1 (continued)
LIST OF PREPARERS

Name	RMP Responsibility	Education	Experience
Sandra J. Hayes	Management Situation Analysis--Wildlife, Recreation, Visual Resources, Wilderness Wildlife Inventory Data Compilation	B.S., Wildlife Science New Mexico State University	BLM 5 yrs. - Wildlife Biologist Range Conservationist
Kenneth E. Holmes	Wildlife	B.S., M.A., Biology Sul Ross State University	BLM 8 yrs. - Wildlife Management Specialist EPA 4 yrs. - Environmental Protection Specialist Ecologist Biologist Corps of Engineers 3 yrs. - Biologist
Jeff Jarvis	Recreation, Wilderness, Visual Resources	B.S., Natural Resources Ohio State University	BLM 6 yrs. - District Outdoor Recreation Planner Outdoor Recreation Planner NPS 2 yrs. - Park Ranger FWS 9 mos. - Work Coordinator (Youth Program)
Pete M. Laudeman	Cultural Resources	B.A., M.A., Anthropology University of Arizona	BLM 8 yrs. - Archaeologist
Gerald Sanchez	Social and Economic Conditions	B.B.A., Economics New Mexico State University	BLM 5 yrs. - Regional Economist Budget Analyst Support Services Supervisor
Joe H. Sanchez	Vegetation, Livestock Grazing, Wild Burros	B.S., Range Science New Mexico State University	BLM 5 yrs. - Surface Reclamation Specialist USFS 2 yrs. - Range Conservationist SCS 3 yrs. - Soil Conservationist

Support Personnel

Robert Gonzales
Mike Howard
Christine Jones
Linda Kaufmann
Richard Meadows
Joe Montes
Gloria Romero
Elena Shaw

TABLE 5-1 (concluded)
LIST OF PREPARERS

CONTRIBUTORS AND REVIEWERS

Las Cruces District

Daniel C. B. Rathbun, District Manager
Robert Calkins, Associate District Manager
Candelario C. Nunez, Area Manager, White Sands Resource Area
Tom Birch, District Range Specialist
Thomas C. Custer, District Geologist
Diana D. Garretson, Public Affairs Specialist
Marvin James, Chief, Division of Planning and Environmental Assistance
Benjamin A. Nunez, Range Specialist
Mary O'Brien, Community Planner
Juan Padilla, District Realty Specialist
Joel Shackelford, ATROW Specialist
C. Dwayne Sykes, Environmental Coordinator
Gilbert Valencia, Cartographic Technician
Richard Watts, Chief, Division of Resource Management

New Mexico State Office

Chris Anderson, Air Quality Specialist
Bob Armstrong, Environmental Specialist
Phil Beck, Realty Specialist
Bernie Chavez, Natural Resource Specialist
Herb Garn, Hydrologist
Edward Heffren, Geologist
Bob Heidemann, Outdoor Recreation Planner
Bill Jonas, Geologist
Jon Joseph, Outdoor Recreation Specialist
Lynn C. Kincaid, Archaeologist
Joe Lara, Chief, Branch of Fluid Minerals
Brian Mills, Wildlife Management Biologist
Ted Rael, Regional Economist
Verlyn D. Saladen, Soil Scientist
Bob Sellers, Natural Resource Specialist
Bill Sharp, Range Conservationist
Jay Thietten, Supervisory Fire Management Officer
Jerry Townsend, Range Conservationist
John W. Whitney, Natural Resource Specialist

Consequences, New Mexico. Nine persons attended each of these sessions. BLM personnel were available to explain the planning process and discuss the concerns of those in attendance.

In addition to written comments, the Las Cruces District Advisory Board met on December 6, 1983, at the Cienega School, northeast of Dell City, Texas. Nine individuals, other than the six Board members, attended. A general discussion of the White Sands RMP was held. Concerns ranged from land disposal to special designations to protection of archaeological sites. A great deal of discussion time was devoted to the access/off-road vehicle issue. Extensive discussion also took place concerning land disposal. No formal recommendations were made by the Board concerning the plan. The White Sands RMP was also an agenda item in meetings held on March 23 and July 24, 1984.

On December 7, 1983, the Las Cruces District Advisory Council met at the New Mexico School for the Visually Handicapped. The Council also discussed the White Sands plan at length. The major part of discussion was devoted to the off-road vehicle issue. A major concern expressed was the lack of a universal definition of a road. The Council indicated those geographic areas it felt needed protection through special designation. No motion of record was made regarding the plan. The White Sands RMP was also an agenda item for the May 23, 1984, Las Cruces District Advisory Council meeting.

A content analysis which included numbers, types, and content of comments received for the White Sands RMP scoping process was sent to all commentators on December 21, 1983.

In January 1984, a letter containing the three issues and planning criteria developed as a result of the analysis of public comment was sent to approximately 500 people. The issues and planning criteria were available for a 30-day review and comment period (January 16, 1984 to February 15, 1984). Public comments received were minor in nature and were used in further refining of the issues and planning criteria. In April 1984, a second mailing was sent to approximately 500 people that contained the formally approved issues and planning criteria that would be used in the White Sands RMP.

Other informal coordination with the public such as telephone calls, personal contacts, etc., have occurred in developing this RMP/EIS. Records of these contacts are located in the White Sands Resource Area Office.

FORMAL CONSULTATION

Consultation with the U.S. Fish and Wildlife Service is required before any project initiated or approved by the BLM is implemented that may affect any Federally threatened, endangered, or sensitive plant or animal or their habitat. This consultation is required by Section 7 of the Endangered Species Act of 1973. This RMP/EIS is considered a major project and formal consultation has been initiated. (Refer to Appendix E-2 for letters of consultation.)

The BLM cultural resource management program operates in accordance with 36 Code of Federal Regulations (CFR), Part 800, which provides specific procedures for consultation between BLM and the State Historic Preservation Officer (SHPO). Memorandum of Agreement (MOA) NMSO-168 between the SHPO, Advisory Council on Historic Preservation, and the BLM New Mexico State Office became effective October 19, 1982. This MOA coordinates the provisions of 36 CFR 800 with existing BLM procedures, emphasizing the BLM planning system. The MOA incorporates procedures for exchanging information with the SHPO concerning cultural resources on public and private lands. It defines those undertakings and activities requiring or not requiring consultation and establishes reporting standards. (Refer to Appendix H for letters of consultation.)

CONSISTENCY WITH OTHER PLANS

The BLM planning regulations require that RMPs be "consistent with officially approved or adopted resource-related plans of other Federal agencies, State and local governments, and Indian tribes, so long as the guidance and resource management plans are also consistent with the purposes, policies, and programs of Federal laws and regulations applicable to public land... ."

Several meetings were held in 1984 with the County Commissioners in Sierra and Otero Counties, the Southern Rio Grande Council of Governments, Alamogordo City Planners, U.S. Forest Service Planners, White Sands Missile Range, Fort Bliss, and other agencies and groups to gather information concerning their desires and plans.

At this time, there are no known inconsistencies between any of the alternatives and officially approved and adopted resource-related policies and programs of other Federal agencies, State and local governments, and Indian tribes. Continuing coordination and consultation will take place during the public comment period on the Draft RMP/EIS, the Final, and the Record of Decision.

PUBLIC REVIEW OF THE DRAFT RMP/EIS

In addition to all grazing permittees within the White Sands Resource Area and other interested individuals on the White Sands RMP mailing list, the Draft RMP/EIS will be sent to and comments requested from:

Congressional Delegation and New Mexico State Legislators

U.S. Senator Jeff Bingaman
U.S. Senator Pete V. Domenici
U.S. Congressman Joe Skeen
State Senator, District 35
State Senator, District 39
State Senator, District 40
State Representative, District 51
State Representative, District 52
State Representative, District 53

New Mexico State Agencies

Agriculture Department
- Livestock Board

Bureau of Mines and Mineral Resources
Commerce and Industry Department
Department of Finance and Administration
- Office of Cultural Affairs
- Museum of New Mexico
- Historic Preservation Division
- State Planning Division

New Mexico State Agencies (continued)

Department of Game and Fish
Energy and Minerals Department
    Oil Conservation Division
Governor's Office
Health and Environment Department
    Environmental Improvement Division
Highway Department
Human Services Department
    Office of Indian Affairs
Land Office
    Commissioner's Office
Natural Resources Department
    Forestry Division
    Parks and Recreation Division
    Administrative Services Division--Heritage Section
Radio Communications Bureau
State Engineer/Interstate Stream Commission
State Police
Taxation and Revenue Department
Transportation Department

Federal Agencies

Department of Agriculture
    Agricultural Research Service
        Jornada Experimental Range
    Agricultural Stabilization and Conservation Service
    Farmer's Home Administration
    Forest Service
    Soil and Conservation Service
Department of Commerce
Department of Defense
    Department of the Army
        Corps of Engineers
        Fort Bliss
        White Sands Missile Range
Department of Justice
    Immigration and Naturalization Service
        Border Patrol
Department of the Interior
    Advisory Council on Historic Preservation
    Bureau of Indian Affairs
    Bureau of Mines
    Bureau of Reclamation
    Fish and Wildlife Service

Federal Agencies (continued)

Department of the Interior (continued)
    Geological Survey
    National Park Service
    Natural Resources Library
    Office of Environmental Project Review
Department of Transportation
Department of Treasury
    Customs Service
Environmental Protection Agency
Federal Highway Administration
International Boundary and Water Commission

Local and Regional Governments, Agencies, and Indian Tribes

Caballo Soil and Water Conservation District
Chamber of Commerce (Alamogordo, El Paso, and Truth or Consequences)
Cities of Alamogordo, El Paso, and Truth or Consequences
El Paso County Commissioners
Elephant Butte Irrigation District
Jornada Resource Conservation and Development Council
Mescalero Apache Tribe
Otero County Commissioners
Otero County Electric Coop, Inc.
Sierra County Commissioners
Southeastern New Mexico Economic Development District
Southern Rio Grande Council of Governments
Village of Tularosa
Village of Williamsburg

Livestock-Related Organizations

Las Cruces District Grazing Advisory Board
New Mexico Cattle Growers Association
New Mexico Farm and Livestock Bureau
New Mexico Wool Growers Association
Otero County Farm and Livestock Bureau
Sierra County Farm and Livestock Bureau

Livestock-Related Organizations (continued)

Society for Range Management
Southeastern New Mexico Grazing Association
Southwestern New Mexico Livestock Grazing Association

Conservation Organizations

Ada County Fish and Game League
Albuquerque Archaeological Society
Earth Environmental Consultants
Environmental Management Services Company
El Paso Archaeological Society
International Society Protection
Izaak Walton League
Mesilla Valley Audubon Society
Mesilla Valley Grotto
National Audubon Society
National Council of Public Land Users
National Wildlife Federation
Natural Resources Defense Council
Nevada Outdoor Recreation Association
New Mexico Archaeological Society
New Mexico Conservation Coordinating Council
New Mexico Natural History Institute
New Mexico Wildlife Federation
New Mexico Wildlife Society
Oregon Environmental Council
Public Lands Council
Public Lands Institute
Sierra Club
- Albuquerque Group
- El Paso Regional Group
- Rio Grande Chapter
- Southwestern New Mexico Group

Soil Conservation Society
Southwest Research and Information Center
Texas Archaeological Society
Wildlife Management Institute
Wilderness Society
Wildlife Society
- New Mexico Chapter

Other Organizations

Amoco Production Company
Atlantic Richfield Company
Burn Construction Company, Inc.
Champlin Petroleum Company
El Paso Electric
El Paso Natural Gas Company
El Paso Water Utilities Public Service Board
Federal Land Bank Association of Albuquerque
Federal Land Bank Association of Las Cruces
Federal Land Bank Association of Roswell
Gas Company of New Mexico
Hunt Energy Corporation
Las Cruces Production Credit Association
Minerals Exploration Coalition
Missing Link Mining Company
New Mexico Mining Association
New Mexico Oil and Gas Association
Noranda Exploration, Inc.
Public Service Company of New Mexico
Rachalk Production, Inc.
Sierra County Miners Association
Western Land Exchanges
Yates Petroleum Corporation

Other Groups

Albuquerque Jeep Herders, Inc.
American Motorcycle Association
Butterfield Trail 4x4 Club
Dona Ana Rockhound Club
El Paso 4x4 Club
Freewheel Cycle Club
Human Systems Research, Inc.
International Right-of-Way Association of New Mexico
Jets Radio Club
Las Cruces District Advisory Council
New Mexico Motorcycle Dealers Association
ORV Use in New Mexico
Prairie Dawgs Motorcycle Club
Quivera Research Center
Sierra Rock Club
Truth or Consequences Off-Road Association
West Texas 4-Wheel Drive Association, Inc.

Universities and Libraries

Alamogordo Public Library
El Paso Public Library
New Mexico Institute of Mining Technology
New Mexico State Library
New Mexico State University
Library
Range Improvement Task Force
Thomas Branigan Memorial Library
Truth or Consequences Public Library
University of New Mexico
University of Texas at El Paso

HEARINGS

Public hearings will be held on the Draft RMP/EIS. Notice for dates and times for these hearings will be announced in advance in the news media and the Federal Register.

APPENDICES

APPENDIX A

LANDS

APPENDIX A-1

LAND TENURE ADJUSTMENT PARCELS
BALANCED ALTERNATIVE

Parcel No.[a]	Township	Range	Section	Subdivision	Acres
1	10 S	2 E	5	Lots 1 and 2, S½NE¼ (less 2.5 acres) NW¼SE¼	198.43
2	10 S	4 W	1	Lots 2-4, SW¼NE¼, S½NW¼, N½SW¼	359.11
4	10 S	5 W	19	Lots 1-4, E½W½	322.40
5	10 S	8 W	12	NE¼NE¼, S½NE¼, SE¼NW¼	160
6	10 S	8 W	21	SW¼NE¼, SE¼NW¼, E½SW¼, W½SE¼	240
6	10 S	8 W	28	NW¼NE¼, NE¼NW¼	80
7	10 S	8 W	29	W½SW¼	80
9	11 S	5 W	28	SE¼SW¼, SW¼SE¼	80
10	11 S	6 W	2	SE¼SW¼	40
11	11 S	6 W	3	SW¼SW¼	40
11	11 S	6 W	4	S½SE¼	80
12	11 S	6 W	6	Lots 4-7	162.04
12	11 S	6 W	7	Lots 1-4	159.20
13	11 S	6 W	8	E½SE¼	80
14	11 S	6 W	18	NE¼	160
15	11 S	7 W	3	Lots 5 (57.58) and 11 (52.44)	110.02
16	11 S	7 W	3	NW¼SE¼	40
17	11 S	7 W	4	SW¼NW¼	40
18	11 S	7 W	4	S½SW¼, NE¼SW¼	120
18	11 S	7 W	5	SE¼SE¼	40
18	11 S	7 W	8	NE¼NE¼	40
20	11 S	7 W	10	NW¼NE¼, NE¼NW¼	80
21	11 S	7 W	11	Lot 2 (37.15)	37.15
22	11 S	7 W	11	Lot 11 (31.95)	31.95
27	12 S	4 W	2	S½NE¼	80
28	12 S	6 W	21	NW¼NE¼	40
29	12 S	6 W	33	W½SW¼	80
30	12 S	7 W	19	Lot 15	41.17
30	12 S	7 W	29	Lots 4 and 5	90.66
30	12 S	7 W	30	Lots 5-19	665.95
30	12 S	8 W	25	NE¼, E½NW¼, S½	560
30	12 S	8 W	24	SE¼SW¼, SW¼SE¼	80
31	12 S	7 W	23	NW¼, N½SW¼	240
32	12 S	7 W	24	Lots 3 (41.57) and 5 (40.95)	82.52
32	12 S	7 W	25	NE¼SW¼, NW¼SE¼, W½NE¼, E½NW¼	240
33	12 S	7 W	26	W½NE¼, E½E½NW¼, E½NE¼SW¼, N½SE¼	220
34	12 S	8 W	9	Lots 11, 12, and 18	97.33
35	12 S	8 W	9	Lots 9-10, 13-17, 19-21	362.50
35	12 S	8 W	10	NE¼SW¼, S½SW¼, S½SE¼	200
35	12 S	8 W	11	SW¼SE¼	40
35	12 S	8 W	14	W½NE¼, NW¼	240
35	12 S	8 W	15	Lots 1-8	331.41

LAND TENURE ADJUSTMENT PARCELS
BALANCED ALTERNATIVE

Parcel No.[a]	Township	Range	Section	Subdivision	Acres
36	12 S	8 W	21	SW¼NW¼, NW¼SW¼, S½SW¼	160
36	12 S	8 W	26	SW¼NE¼, S½NW¼, N½SW¼, SE¼SW¼	240
36	12 S	8 W	27	S½N½	160
36	12 S	8 W	28	S½NE¼, NW¼, SW¼, W½SE¼	480
36	12 S	8 W	33	N½N½	160
40	13 S	4 W	22	Lot 3 (30.12)	30.12
42	13 S	6 W	4	S½NW¼	80
43	13 S	6 W	6	Lots 3-7, S½NE¼, SE¼NW¼, NE¼SW¼	342.45
43	13 S	7 W	1	Lots 1-4, S½N½, N½S½	481.60
44	13 S	6 W	10	SE¼SW¼	40
44	13 S	6 W	15	NE¼NW¼	40
45	13 S	6 W	15	SW¼SW¼	40
46	13 S	6 W	28	SE¼NE¼, SE¼	200
47	13 S	6 W	33	W½NW¼	80
48	13 S	7 W	12	N½NE¼, SW¼NE¼	120
49	13 S	7 W	13	S½	320
49	13 S	7 W	14	Lots 2 and 3	76.66
49	13 S	7 W	23	W½NE¼	80
49	13 S	7 W	24	N½	320
50	13 S	7 W	24	S½NW¼	80
51	14 S	2 W	33	NW¼	160
52	14 S	3 W	4	Lot 4	44.54
53	14 S	3 W	6	Lot 5	50.30
54	15 S	4 W	6	Lots 4 and 5, W½NW¼	80.77
55	14 S	5 W	12	SW¼NE¼, NW¼SE¼	80
56	14 S	6 W	6	Lot 7 (SW¼SW¼)	36.30
58	15 S	4 W	31	E½E½	160
59	15 S	5 W	35	S½	320
59	15 S	5 W	36	SW¼	160
63	16 S	6 W	15	SW¼NW¼	40
64	16 S	6 W	30	NE¼SW¼	40
67	16 S	6 W	18	Lot 1	40.77
68	17 S	6 W	31	All	640
69	18 S	6 W	3	N½NE¼, NE¼NW¼	120
70	17 S	7 W	6	Lots 5-7	113.14
70	17 S	7 W	7	Lots 1-4, E½, NE¼NW¼, E½SW¼	590.04
70	17 S	7 W	8	W½	320
70	17 S	7½ W	1	Lots 3 and 4, E½SE¼	130.36
70	17 S	8 W	1	SE¼SE¼	40
70	17 S	7½ W	12	Lots 5-9	156.36
70	18 S	8 W	12	Lots 1-5	177.29
71	18 S	6 W	3	SE¼	160
73	18 S	6 W	17	N½NE¼	80
74	18 S	7 W	27	N½SW¼, SE¼	240
74	18 S	7 W	26	S½	320
74	18 S	7 W	35	NE¼, E½NW¼, NW¼NW¼	280

LAND TENURE ADJUSTMENT PARCELS
BALANCED ALTERNATIVE

Parcel No.[a]	Township	Range	Section	Subdivision	Acres
75	18 S	7½ W	12	Lot 4	16.10
75	18 S	7½ W	13	NE¼NE¼	40
76	19 S	5 W	25	S½N½	160
77	19 S	6 W	34	Lot 3 (SW¼SE¼)	39.81
78	19 S	8 W	13	S½S½	160
79	11 S	9 E	28	S½SW¼	80
79	11 S	9 E	33	N½NW¼	80
80	12 S	9 E	1	Lots 3 and 4, S½NW¼, SW¼	320.15
81	12 S	9 E	2	Lots 3 and 4, S½NW¼	160.32
83	13 S	11 E	1	Lots 4 and 5 (E½SW¼), W½SW¼	156.44
84	13 S	11 E	5	Lots 3 and 4	7.23
85	13 S	11 E	5	N½SE¼	80
85	13 S	11 E	6	Lots 1-11	229.23
86	13 S	11 E	12	Lot 4, SW¼SW¼	77.92
86	13 S	11 E	13	Lots 1-4, W½W½	309.10
86	13 S	11 E	24	Lots 1-3, W½NW¼	190.70
87	13 S	11 E	24	SW¼SW¼	40
87	13 S	11 E	23	Lots 1 and 2	75.24
89	13 S	11 E	28	NE¼NE¼NE¼, SW¼NE¼NE¼, NW¼NE¼NE¼	30
90	13 S	11 E	32	S½NE¼	80
91	13 S	11 E	32	NE¼SW¼	40
93	14 S	11 E	5	Lot 3	43.72
94	14 S	11 E	6	Lot 14, W½SE¼	120
94	14 S	11 E	7	Lots 1-3, NW¼NE¼	146.50
95	14 S	11 E	17	SW¼, SW¼SE¼	200
98	14 S	9 E	21	NW¼NE¼, N½NW¼	120
99	14 S	9 E	28	W½NW¼	80
100	14 S	9 E	28	S½SW¼	80
100	14 S	9 E	33	NW¼NW¼	40
101	14 S	9 E	33	SW¼	160
101	15 S	9 E	4	Lots 3 (43.40) and 4 (43.66)	87.06
102	15 S	10 E	8	W½SE¼ (W of highway)	80
103	15 S	10 E	17	E½SW¼	80
104	15 S	10 E	18	Lots 3 and 4, NE¼, E½SW¼, W½SE¼	399.24
105	15 S	10 E	27	NW¼NW¼	40
106	15 S	10 E	29	SE¼, SE¼SW¼	200
107	15 S	10 E	30	NW¼NW¼	40.21
108	15 S	10 E	31	S½NW¼, SE¼	240
109	15 S	10 E	34	E½NE¼	80
110	15 S	9 E	9	S½S½	160
111	15 S	9 E	10	N½SW¼	80
112	16 S	10 E	4	All	1,164.76
112	16 S	10 E	5	NE¼SW¼, SE¼	200
113	16 S	10 E	21	S½SE¼	80
114	16 S	10 E	32	N½SW¼	80
115	16 S	10 E	33	NE¼SE¼, N½NE¼, SE¼NE¼	160

LAND TENURE ADJUSTMENT PARCELS
BALANCED ALTERNATIVE

Parcel No.[a]	Township	Range	Section	Subdivision	Acres
116	16 S	10 E	33	NE¼SW¼	40
117	16 S	9 E	3	Lots 1 (25.29) and 2 (25.56), S½NE¼	131.15
118	16 S	9 E	3	Lot 4, SW¼NW¼	65.51
118	16 S	9 E	4	Lot 1, SE¼NE¼, S½	385.49
118	16 S	9 E	9	N½	320
119	16 S	9 E	5	Lots 3 (25.59) and 4 (25.67)	51.26
119	16 S	9 E	6	Lot 1	25.78
120	16 S	9 E	6	Lot 4	19.96
121	16 S	9 E	6	Lot 6, NE¼SW¼	71.09
122	16 S	9 E	27	SE¼SW¼	40
123	17 S	9 E	13	NE¼	160
123	17 S	10 E	7	N½NW¼	80
124	17 S	10 E	20	S½SW¼	80
125	17 S	9 E	4	W½SW¼	80
126	17 S	9 E	23	SW¼SE¼	40
126	17 S	9 E	26	N½NW¼NE¼, S½NW¼NE¼	40
127	18 S	9 E	1	Lots 3 (23.09) and 4 (23.02)	46.11
128	18 S	9 E	10	NW¼SE¼	40
129	19 S	9 E	1	S½S½, NE¼SE¼	200
129	19 S	10 E	5	S½N½, N½SW¼, SW¼SW¼, NW¼SE¼	320
129	19 S	10 E	6	S½N½, S½, Lots 3 and 4	591.27
129	19 S	10 E	7	NE¼, N½SE¼	240
129	19 S	10 E	8	NW¼, N½SW¼	240
130	19 S	10 E	9	NE¼NW¼	40
131	19 S	10 E	14	NW¼	160
132	15 S	16 E	24	Lots 2 and 3, SE¼NW¼	63.20
133	15 S	16 E	25	W½SW¼	80
134	16 S	15 E	1	Lots 1-8	225.20
135	16 S	15 E	1	SE¼SE¼	40
136	16 S	15 E	1	SE¼SW¼	40
137	17 S	15 E	11	N½N½, W½SW¼NE¼, S½NW¼, N½SW¼, W½SW¼SW¼, N½NW¼SE¼	380
137	17 S	15 E	14	W½W½NW¼	40
137	17 S	15 E	15	N½NE¼NE¼	20
137	17 S	15 E	10	E½E½	160
138	17 S	15 E	21	NW¼NE¼, N½NW¼, SW¼NW¼, W½SW¼, SE¼SW¼, SW¼SE¼	320
138	17 S	15 E	28	N½NW¼, NW¼NE¼	120
139	18 S	15 E	33	S½SW¼SE¼	20
140	19 S	15 E	12	SW¼NE¼	40
141	20 S	15 E	26	W½	320
141	20 S	15 E	27	E½NE¼	80
141	20 S	15 E	35	N½NW¼	80
142	20 S	15 E	33	S½NE¼, SE¼NW¼, NE¼SW¼, N½SE¼	240
142	20 S	15 E	34	SW¼NW¼, N½S½	200
142	20 S	15 E	35	NW¼SW¼	40

LAND TENURE ADJUSTMENT PARCELS
BALANCED ALTERNATIVE

Parcel No.a/	Township	Range	Section	Subdivision	Acres
143	20 S	15 E	35	S½NE¼, SE¼	240
144	20 S	14 E	4	Lots 5 and 6, SW¼	218.90
145	20 S	14 E	6	E½SE¼	80
147	20 S	14 E	11	NW¼SE¼	40
148	20 S	14 E	18	NE¼, E½NW¼, W½SE¼	320
149	20 S	14 E	19	NE¼, Lot 2, SE¼NW¼, NE¼SW¼, Lot 3	318.32
150	20 S	14 E	21	N½, N½S½	480
151	20 S	14 E	30	NE¼SE¼	40
153	21 S	14 E	12	SE¼NE¼, NE¼SE¼	80
155	22 S	14 E	5	All	638.40
156	22 S	13 E	22	S½NE¼, SE¼	240
157	23 S	12 E	13	E½NE¼, NW¼, N½SW¼, NW¼SE¼	360
157	23 S	12 E	14	N½S½	160
158	24 S	20 E	33	S½SE¼	80
159	25 S	20 E	12	NE¼, E½W½, N½SE¼	400
164	26 S	18 E	27	SW¼	160
165	26 S	17 E	8	S½SW¼	80
168	26 S	17 E	30	Lots 3 and 4, E½SW¼, SE¼	327.84
169	26 S	17 E	32	Lots 2 and 4, N½N½	224.93
170	26 S	17 E	34	NE¼NE¼, Lot 1 (31.88)	71.88
170	26 S	17 E	35	NW¼NW¼, Lot 4 (31.84)	71.84
171	26 S	16 E	28	SW¼	160
171	26 S	16 E	33	N½NW¼, Lots 3 and 4	142.30
172	26 S	16 E	31	N½NE¼, Lots 4 and 5	140
173	26 S	15 E	13	NE¼NE¼	40
174	26 S	14 E	21	S½	320
174	26 S	13 E	20	E½	320

Source: BLM Las Cruces District Files, 1984.

Note: a/These numbers correspond to those on Visuals E and F.

APPENDIX A-2

LAND TENURE ADJUSTMENT PARCELS
PRODUCTION ALTERNATIVE

Parcel No.[a]	Township	Range	Section	Subdivision	Acres
1	10 S	2 E	5	Lots 1 and 2, S½NE¼ (less 2.5 acres) NW¼SE¼	198.43
2	10 S	4 W	1	Lots 2-4, SW¼NE¼, S½NW¼, N½SW¼	359.11
3	10 S	5 W	22	Lots 1-4, SE¼	308.76
4	10 S	5 W	19	Lots 1-4, E½W½	322.40
5	10 S	8 W	12	NE¼NE¼, S½NE¼, SE¼NW¼	160
6	10 S	8 W	21	SW¼NE¼, SE¼NW¼, E½SW¼, W½SE¼	240
6	10 S	8 W	28	NW¼NE¼, NE¼NW¼	80
7	10 S	8 W	29	W½SW¼	80
8	11 S	5 W	28	NW¼SW¼	40
9	11 S	5 W	28	SE¼SW¼, SW¼SE¼	80
10	11 S	6 W	2	SE¼SW¼	40
11	11 S	6 W	3	SW¼SW¼	40
11	11 S	6 W	4	S½SE¼	80
12	11 S	6 W	6	Lots 4-7	162.04
12	11 S	6 W	7	Lots 1-4	159.20
12	11 S	7 W	1	Lots 5-13, 15-17, 20	600.50
12	11 S	7 W	12	Lots 1, 3-11, 13-15	543.15
13	11 S	6 W	8	E½SE¼	80
14	11 S	6 W	18	NE¼	160
15	11 S	7 W	3	Lots 5 (57.58) and 11 (52.44)	110.02
16	11 S	7 W	3	NW¼SE¼	40
17	11 S	7 W	4	SW¼NW¼	40
18	11 S	7 W	4	S½SW¼, NE¼SW¼	120
18	11 S	7 W	5	SE¼SE¼	40
18	11 S	7 W	8	NE¼NE¼	40
19	11 S	7 W	9	Lot 1 (NW¼NE¼)	40.44
20	11 S	7 W	10	NW¼NE¼, NE¼NW¼	80
21	11 S	7 W	11	Lot 2 (37.15)	37.15
22	11 S	7 W	11	Lot 11 (31.95)	31.95
23	11 S	7 W	13	NW¼SW¼	40
23	11 S	7 W	14	S½NE¼, E½NW¼, NE¼SW¼, N½SE¼, SW¼SE¼	320
24	11 S	7 W	21	Lot 4	41.13
25	11 S	7 W	22	W½NE¼, NW¼	240
26	11 S	7 W	29	N½NE¼	80
26	11 S	7 W	28	NW¼NW¼	40
27	12 S	4 W	2	S½NE¼	80
28	12 S	6 W	21	NW¼NE¼	40
29	12 S	6 W	33	W½SW¼	80

LAND TENURE ADJUSTMENT PARCELS
PRODUCTION ALTERNATIVE

Parcel No.[a]	Township	Range	Section	Subdivision	Acres
30	12 S	7 W	19	Lot 15	41.17
30	12 S	7 W	29	Lots 4 and 5	90.66
30	12 S	7 W	30	Lots 5-19	665.95
30	12 S	8 W	25	NE¼, E½NW¼, S½	560
30	12 S	8 W	24	SE¼SW¼, SW¼SE¼	80
31	12 S	7 W	23	NW¼, N½SW¼	240
32	12 S	7 W	24	Lots 3 (41.57) and 5 (40.95)	82.52
32	12 S	7 W	25	NE¼SW¼, NW¼SE¼, W½NE¼, E½NW¼	240
33	12 S	7 W	26	W½NE¼, E½E½NW¼, E½NE¼SW¼, N½SE¼	220
34	12 S	8 W	9	Lots 11, 12, and 18	97.33
35	12 S	8 W	9	Lots 9-10, 13-17, 19-21	362.50
35	12 S	8 W	10	NE¼SW¼, S½SW¼, S½SE¼	200
35	12 S	8 W	11	SW¼SE¼	40
35	12 S	8 W	14	W½NE¼, NW¼	240
35	12 S	8 W	15	Lots 1-8	331.41
36	12 S	8 W	21	SW¼NW¼, NW¼SW¼, S½SW¼	160
36	12 S	8 W	26	SW¼NE¼, S½NW¼, N½SW¼, SE¼SW¼	240
36	12 S	8 W	27	S½N½	160
36	12 S	8 W	28	S½NE¼, NW¼, SW¼, W½SE¼	480
36	12 S	8 W	33	N½N½	160
37	13 S	1 W	7	N½NE¼	80
38	13 S	4 W	9	All	640
38	13 S	4 W	10	Lots 1-4, W½NE¼, S½NW¼, SW¼, W½SE¼	520.08
38	13 S	4 W	15	Lots 1 and 2	59.70
39	13 S	4 W	17	SE¼NE¼	40
40	13 S	4 W	22	Lot 3 (30.12)	30.12
41	13 S	4 W	31	S½SE¼(Part SE of I-25)	22.50
42	13 S	6 W	4	S½NW¼	80
43	13 S	6 W	6	Lots 3-7, S½NE¼, SE¼NW¼, NE¼SW¼	342.45
43	13 S	7 W	1	Lots 1-4, S½N½, N½S½	481.60
44	13 S	6 W	10	SE¼SW¼	40
44	13 S	6 W	15	NE¼NW¼	40
45	13 S	6 W	15	SW¼SW¼	40
46	13 S	6 W	28	SE¼NE¼, SE¼	200
47	13 S	6 W	33	W½NW¼	80
48	13 S	7 W	12	N½NE¼, SW¼NE¼	120
49	13 S	7 W	13	S½	320
49	13 S	7 W	14	Lots 2 and 3	76.66
49	13 S	7 W	23	W½NE¼	80
49	13 S	7 W	24	N½	320
50	13 S	7 W	24	S½NW¼	80
51	14 S	2 W	33	NW¼	160
52	14 S	3 W	4	Lot 4	44.54
53	14 S	3 W	6	Lot 5	50.30
54	14 S	4 W	31	S½NW¼, SW¼	240
54	15 S	4 W	6	Lots 4 and 5, W½NW¼	80.77

LAND TENURE ADJUSTMENT PARCELS
PRODUCTION ALTERNATIVE

Parcel No.[a]	Township	Range	Section	Subdivision	Acres
55	14 S	5 W	12	SW¼NE¼, NW¼SE¼	80
56	14 S	6 W	6	Lot 7 (SW¼SW¼)	36.30
57	14 S	7 W	1	S½SW¼	80
57	14 S	7 W	12	Lots 1 and 2	83.04
58	15 S	4 W	31	E½E½	160
59	15 S	5 W	35	S½	320
59	15 S	5 W	36	SW¼	160
60	15 S	6 W	31	Lots 1 and 5, NE¼, E½NW¼	299.64
61	15 S	7 W	13	N½SE¼	80
62	16 S	5 W	14	S½S½NE¼, part W of I-25	2
63	16 S	6 W	15	SW¼NW¼	40
64	16 S	6 W	30	NE¼SW¼	40
65	16 S	7 W	1	NE¼SE¼	40
66	16 S	7 W	1	SE¼SW¼, SW¼SE¼	80
67	16 S	6 W	18	Lot 1	40.77
68	17 S	6 W	31	All	640
68	18 S	6 W	6	Lots 2-5, SW¼NE¼, SE¼NW¼, NE¼SW¼	282.67
69	17 S	6 W	33	SE¼SW¼, S½SE¼	120
69	17 S	6 W	34	S½SW¼, SW¼SE¼	120
69	18 S	6 W	3	N½NE¼, NE¼NW¼	120
70	17 S	7 W	6	Lots 5-7	113.14
70	17 S	7 W	7	Lots 1-4, E½, NE¼NW¼, E½SW¼	590.04
70	17 S	7 W	8	W½	320
70	17 S	7½ W	1	Lots 3 and 4, E½SE¼	130.36
70	17 S	8 W	1	SE¼SE¼	40
70	17 S	7½ W	12	Lots 5-9	156.36
70	18 S	8 W	12	Lots 1-5	177.29
71	18 S	6 W	3	SE¼	160
72	18 S	6 W	4	S½N½, S½	480
72	18 S	6 W	5	All	647.68
72	18 S	6 W	8	N½SE¼, NE¼NW¼	120
72	18 S	6 W	9	NW¼NW¼	40
73	18 S	6 W	17	N½NE¼	80
74	18 S	7 W	27	N½SW¼, SE¼	240
74	18 S	7 W	26	S½	320
74	18 S	7 W	35	NE¼, E½NW¼, NW¼NW¼	280
75	18 S	7½ W	12	Lot 4	16.10
75	18 S	7½ W	13	NE¼NE¼	40
76	19 S	5 W	25	S½N½	160
77	19 S	6 W	34	Lot 3 (SW¼SE¼)	39.81
78	19 S	8 W	13	S½S½	160
79	11 S	9 E	28	S½SW¼	80
79	11 S	9 E	33	N½NW¼	80
80	12 S	9 E	1	Lots 3 and 4, S½NW¼, SW¼	320.15
81	12 S	9 E	2	Lots 3 and 4, S½NW¼	160.32
82	12 S	9 E	35	W½NE¼, E½W½, SW¼SE¼	280

LAND TENURE ADJUSTMENT PARCELS
PRODUCTION ALTERNATIVE

Parcel No.[a]	Township	Range	Section	Subdivision	Acres
83	13 S	11 E	1	Lots 4 and 5 (E½SW¼), W½SW¼	156.44
84	13 S	11 E	5	Lots 3 and 4	7.23
85	13 S	11 E	5	N½SE¼	80
85	13 S	11 E	6	Lots 1-11	229.23
86	13 S	11 E	12	Lot 4, SW¼SW¼	77.92
86	13 S	11 E	13	Lots 1-4, W½W½	309.10
86	13 S	11 E	24	Lots 1-3, W½NW¼	190.70
87	13 S	11 E	24	SW¼SW¼	40
87	13 S	11 E	23	Lots 1 and 2	75.24
87	13 S	11 E	26	NW¼NW¼NE¼	10
88	13 S	11 E	26	SE¼SE¼NW¼, NE¼SW¼	50
89	13 S	11 E	28	NE¼NE¼NE¼, SW¼NE¼NE¼, NW¼NE¼NE¼	30
90	13 S	11 E	32	S½NE¼	80
91	13 S	11 E	32	NE¼SW¼	40
92	13 S	11 E	35	NE¼NE¼, S½NE¼, N½SE¼NW¼, NW¼SW¼SE¼NW¼, E½SE¼SE¼NW¼, S½NE¼SW¼, SE¼, NE¼NE¼NE¼SW¼, S½N½NE¼SW¼	340
93	14 S	11 E	5	Lot 3	43.72
94	14 S	11 E	6	Lot 14, W½SE¼	120
94	14 S	11 E	7	Lots 1-3, NW¼NE¼	146.50
95	14 S	11 E	17	SW¼, SW¼SE¼	200
96	14 S	10 E	12	SE¼NE¼	40
97	14 S	10 E	12	NW¼SE¼	40
98	14 S	9 E	21	NW¼NE¼, N½NW¼	120
99	14 S	9 E	28	W½NW¼	80
100	14 S	9 E	28	S½SW¼	80
100	14 S	9 E	33	NW¼NW¼	40
101	14 S	9 E	33	SW¼	160
101	15 S	9 E	4	Lots 3 (43.40) and 4 (43.66)	87.06
102	15 S	10 E	8	W½SE¼ (W of highway)	80
103	15 S	10 E	17	E½SW¼	80
103	15 S	10 E	20	NW¼, N½SW¼, NW¼SE¼	280
104	15 S	10 E	18	Lots 3 and 4, NE¼, E½SW¼, W½SE¼	399.24
104	15 S	10 E	19	Lots 1 and 2, E½NE¼, W½NW¼	239.60
105	15 S	10 E	27	NW¼NW¼	40
106	15 S	10 E	29	SE¼, SE¼SW¼	200
107	15 S	10 E	30	NW¼NW¼	40.21
108	15 S	10 E	31	S½NW¼, SE¼	240
109	15 S	10 E	34	E½NE¼	80
110	15 S	9 E	9	S½S½	160
111	15 S	9 E	10	N½SW¼	80
112	16 S	10 E	4	All	1,164.76
112	16 S	10 E	5	NE¼SW¼, SE¼	200
113	16 S	10 E	21	S½SE¼	80
114	16 S	10 E	32	N½SW¼	80

LAND TENURE ADJUSTMENT PARCELS
PRODUCTION ALTERNATIVE

Parcel No.[a]	Township	Range	Section	Subdivision	Acres
115	16 S	10 E	33	NE¼SE¼, N½NE¼, SE¼NE¼	160
116	16 S	10 E	33	NE¼SW¼	40
117	16 S	9 E	3	Lots 1 (25.29) and 2 (25.56), S½NE¼	131.15
118	16 S	9 E	3	Lot 4, SW¼NW¼	65.51
118	16 S	9 E	4	Lot 1, SE¼NE¼, S½	385.49
118	16 S	9 E	9	N½	320
119	16 S	9 E	5	Lots 3 (25.59) and 4 (25.67)	51.26
119	16 S	9 E	6	Lot 1	25.78
120	16 S	9 E	6	Lot 4	19.96
121	16 S	9 E	6	Lot 6, NE¼SW¼	71.09
122	16 S	9 E	27	SE¼SW¼	40
123	17 S	9 E	13	NE¼	160
123	17 S	10 E	7	N½NW¼	80
124	17 S	10 E	20	S½SW¼	80
125	17 S	9 E	4	W½SW¼	80
126	17 S	9 E	23	SW¼SE¼	40
126	17 S	9 E	26	N½NW¼NE¼, S½NW¼NE¼	40
127	18 S	9 E	1	Lots 3 (23.09) and 4 (23.02)	46.11
128	18 S	9 E	10	NW¼SE¼	40
129	19 S	9 E	1	S½S½, NE¼SE¼	200
129	19 S	10 E	5	S½N½, N½SW¼, SW¼SW¼, NW¼SE¼	320
129	19 S	10 E	6	S½N½, S½, Lots 3 and 4	591.27
129	19 S	10 E	7	NE¼, N½SE¼	240
129	19 S	10 E	8	NW¼, N½SW¼	240
130	19 S	10 E	9	NE¼NW¼	40
131	19 S	10 E	14	NW¼	160
132	15 S	16 E	24	Lots 2 and 3, SE¼NW¼	63.20
133	15 S	16 E	25	W½SW¼	80
134	16 S	15 E	1	Lots 1-8	225.20
135	16 S	15 E	1	SE¼SE¼	40
136	16 S	15 E	1	SE¼SW¼	40
137	17 S	15 E	11	N½N½, W½SW¼NE¼, S½NW¼, N½SW¼, W½SW¼SW¼, N½NW¼SE¼	380
137	17 S	15 E	14	W½W½NW¼	40
137	17 S	15 E	15	N½NE¼NE¼	20
137	17 S	15 E	10	E½E½	160
138	17 S	15 E	21	NW¼NE¼, N½NW¼, SW¼NW¼, W½SW¼, SE¼SW¼, SW¼SE¼	320
138	17 S	15 E	28	N½NW¼, NW¼NE¼	120
139	18 S	15 E	33	S½SW¼SE¼	20
140	19 S	15 E	12	SW¼NE¼	40
141	20 S	15 E	26	W½	320
141	20 S	15 E	27	E½NE¼	80
141	20 S	15 E	35	N½NW¼	80

LAND TENURE ADJUSTMENT PARCELS
PRODUCTION ALTERNATIVE

Parcel No.[a]	Township	Range	Section	Subdivision	Acres
142	20 S	15 E	33	S½NE¼, SE¼NW¼, NE¼SW¼, N½SE¼	240
142	20 S	15 E	34	SW¼NW¼, N½S½	200
142	20 S	15 E	35	NW¼SW¼	40
143	20 S	15 E	35	S½NE¼, SE¼	240
144	20 S	14 E	4	Lots 5 and 6, SW¼	218.90
145	20 S	14 E	6	E½SE¼	80
146	20 S	14 E	7	Lots 2 and 3, SE¼NW¼, NE¼SW¼, S½NE¼, N½SE¼	316.78
146	20 S	14 E	8	N½, N½S½	480
147	20 S	14 E	11	NW¼SE¼	40
148	20 S	14 E	18	NE¼, E½NW¼, W½SE¼	320
149	20 S	14 E	19	NE¼, Lot 2, SE¼NW¼, NE¼SW¼, Lot 3	318.32
150	20 S	14 E	21	N½, N½S½	480
151	20 S	14 E	30	NE¼SE¼	40
152	21 S	15 E	1	Lots 2, 3, 6, and 7	154.96
153	21 S	15 E	7	Lots 1-3, SW¼NE¼, SE¼NW¼, NE¼SW¼, SE¼	387.69
153	21 S	14 E	12	SE¼NE¼, NE¼SE¼	80
154	21 S	13 E	35	SE¼	160
155	22 S	14 E	5	All	638.40
156	22 S	13 E	22	S½NE¼, SE¼	240
157	23 S	12 E	13	E½NE¼, NW¼, N½SW¼, NW¼SE¼	360
157	23 S	12 E	14	N½S½	160
158	24 S	20 E	33	S½SE¼	80
158	25 S	20 E	3	Lots 1-4 (N½N½)	160.64
158	25 S	20 E	4	Lots 1 and 2	80.95
159	25 S	20 E	12	NE¼, E½W½, N½SE¼	400
160	26 S	20 E	11	E½NE¼	80
161	26 S	20 E	13	SE¼SE¼	40
161	26 S	20 E	24	E½NE¼, SW¼NE¼	120
162	26 S	20 E	14	N½NE¼	80
163	26 S	20 E	23	SE¼NE¼	40
164	26 S	18 E	27	SW¼	160
165	26 S	17 E	8	S½SW¼	80
166	26 S	17 E	16	S½NE¼, W½, SE¼	560
166	26 S	17 E	21	N½N½, SE¼NE¼, S½NW¼, NE¼SE¼, S½SE¼	400
166	26 S	17 E	28	E½	320
167	26 S	17 E	29	N½	320
168	26 S	17 E	30	Lots 3 and 4, E½SW¼, SE¼	327.84
169	26 S	17 E	32	Lots 2 and 4, N½N½	224.93
170	26 S	17 E	34	NE¼NE¼, Lot 1 (31.88)	71.88
170	26 S	17 E	35	NW¼NW¼, Lot 4 (31.84)	71.84
171	26 S	16 E	28	SW¼	160
171	26 S	16 E	33	N½NW¼, Lots 3 and 4	142.30

LAND TENURE ADJUSTMENT PARCELS
PRODUCTION ALTERNATIVE

Parcel No.a/	Township	Range	Section	Subdivision	Acres
172	26 S	16 E	31	N½NE¼, Lots 4 and 5	140
173	26 S	15 E	13	NE¼NE¼	40
174	26 S	14 E	21	S½	320
174	26 S	13 E	20	E½	320

Source: BLM Las Cruces District Files, 1984.

Note: a/These numbers correspond to those on Visuals E and F.

APPENDIX A-3

POTENTIAL ACQUISITION LANDS[a/]
PROTECTION ALTERNATIVE

Township	Range	Section	Subdivision	Acres
			WATERSHED TREATMENT AREAS	
Area 1 -- Three Rivers Watershed (North of Tularosa)				
10 S	8 E	1	SW¼	160
10 S	8 E	2	SE¼SW¼	40
10 S	8 E	11	NE¼, N½SE¼, SW¼SE¼, SE¼SW¼	320
10 S	8 E	12	S½SW¼	80
10 S	8 E	13	N½NW¼	80
10 S	8 E	14	N½, SW¼, NW¼SE¼	520
10 S	8 E	15	SE¼NE¼, SE¼	200
10 S	8 E	22	NE¼, E½NW¼, NE¼SW¼, NW¼SE¼	320
10 S	8 E	23	N½NW¼	80
10 S	8 E	36	All	640
10 S	9 E	4	N½SE¼, S½SW¼, NW¼SW¼	200
10 S	9 E	5	S½	320
10 S	9 E	6	SW¼	160
10 S	9 E	7	N½	320
10 S	9 E	8	N½	320
10 S	9 E	9	N½NW¼, N½NE¼, NW¼SW¼	200
10 S	9 E	16	All	640
10 S	9 E	32	All	640
11 S	9 E	2	Lots 1-4	52
11 S	9 E	16	All	640
11 S	9 E	22	NE¼SE¼	40
11 S	9 E	27	NW¼NW¼	40
11 S	9½ E	16	All	640
TOTAL				6,652
Area 2 -- Unnamed Watersheds East of Tularosa and South of Tularosa River				
14 S	10 E	13	NE¼, S½NW¼	240
14 S	10 E	14	NE¼SW¼	40
14 S	10 E	27	NW¼SE¼, NE¼SW¼	80
14 S	10 E	27	S½NE¼, S½SE¼, NE¼SW¼, S½SW¼, NW¼SW¼	320
14 S	10 E	36	All	640
14 S	11 E	16	W½, SW¼	480
14 S	11 E	17	S½NW¼, E½NE¼, SW¼NE¼, E½SE¼, NW¼SE¼	320
14 S	11 E	17	NW¼NE¼, NE¼NW¼	80
14 S	11 E	18	Lots 1-6	213.17
14 S	11 E	18	Lots 7-12, E½	532.71
14 S	11 E	19	E½SE¼, SE¼SW¼, E½NE¼	200
14 S	11 E	20	W½NW¼, NE¼NW¼, N½NE¼	200

POTENTIAL ACQUISITION LANDS[a/]
PROTECTION ALTERNATIVE

Township	Range	Section	Subdivision	Acres
			WATERSHED TREATMENT AREAS (continued)	
Area 2 (continued) -- Unnamed Watersheds East of Tularosa and South of Tularosa River				
14 S	11 E	20	SE¼NW¼, NE¼, SW¼, N½SE¼	440
14 S	11 E	21	NW¼NW¼, SE¼NW¼	80
14 S	11 E	29	N½NW¼	160
14 S	11 E	30	Lots 1-2, 4, 5, 8-11	291.07
14 S	11 E	31	Lot 3	25.87
14 S	11 E	32	All	640
15 S	10 E	2	All	640
15 S	11 E	4	NW¼	160
TOTAL				5,782.82
Area 3 -- Moccasin and Otto Draws (Southeast of Pinon)				
20 S	14 E	36	SW¼SW¼	40
21 S	14 E	1	Lots 5-8, 12, W½SW¼, SE¼SW¼, S½SE¼	400
21 S	14 E	2	All	640
21 S	14 E	11	NE¼	160
21 S	14 E	12	W½NE¼, NE¼NE¼, NW¼, W½SE¼, SE¼SE¼	400
21 S	14 E	13	N½NE¼, SW¼NE¼, W½SE¼, SE¼SE¼, NE¼SW¼	280
21 S	14 E	14	S½SE¼, S½SW¼	160
21 S	14 E	23	N½NE¼, NE¼NW¼	120
21 S	14 E	24	NW¼, E½NE¼, NW¼NE¼, E½SE¼	360
21 S	14 E	25	N½SE¼	80
21 S	14 E	36	N½	320
21 S	15 E	5	Lot 12, W½SW¼	120
21 S	15 E	6	Lot 14, SE¼SW¼	75.91
21 S	15 E	7	Lot 4, SE¼SW¼, N½NE¼, SW¼NE¼, NE¼NW¼	235.83
21 S	15 E	8	W½NE¼, SW¼, W½SE¼, SE¼SE¼	360
21 S	15 E	17	W½	320
21 S	15 E	18	N½NE¼, N½NW¼, S½SW¼	240
21 S	15 E	20	E½NW¼	80
21 S	15 E	29	S½NW½	80
21 S	15 E	30	Lots 1-3, S½NE¼, SE¼NW¼, E½SW¼, S½SE¼	387.77
21 S	15 E	31	N½NE¼	80
21 S	15 E	32	NW¼, N½NE¼	240
TOTAL				5,179.51

POTENTIAL ACQUISITION LANDS[a/]
PROTECTION ALTERNATIVE

Township	Range	Section	Subdivision	Acres
			WATERSHED TREATMENT AREAS (continued)	
Area 4 -- Wind and Chess Draws (Cornudas Mountains)				
25 S	14 E	36	All	640
25 S	15 E	32	W½SW¼, S½SE¼	160
26 S	14 E	2	All	640
26 S	14 E	16	All	640
26 S	14 E	25	NW¼	160
26 S	14 E	36	N½	320
26 S	15 E	5	SW¼NE¼, SE¼NW¼, NW¼SE¼, NE¼SW¼	160
26 S	15 E	16	All	640
26 S	15 E	32	N½	320
TOTAL				3,680
Area 5 -- East of Crow Flats				
24 S	18 E	36	E½	320
24 S	19 E	32	W½	320
25 S	19 E	32	All	640
26 S	19 E	16	NW¼	160
TOTAL				1,440
			THREE RIVERS PETROGLYPH SITE	
Area 6				
11 S	9½ E	21	SE¼SE¼	40
11 S	9½ E	28	N½NE¼	80
TOTAL				120
			SACRAMENTO ESCARPMENT AREA OF CRITICAL ENVIRONMENTAL CONCERN	
Area 7				
17 S	10 E	8	NE¼SE¼	40
17 S	10 E	26	NW¼SE¼	40
TOTAL				80

Source: BLM Las Cruces District Office Files, 1984.

Note: a/Map 2-6 shows the general location of the areas contained in this Appendix.

APPENDIX B

WATER RESOURCES

APPENDIX B-1

WATER RESOURCES
METHODOLOGY--SURFACE RUNOFF

The method used to estimate surface runoff is a storm runoff model based on Soil Conservation Service (SCS) methods. The initial version of the computer program was developed by R. H. Hawkins, Utah State University.

Determining volume or peak rate of surface runoff from regional areas is difficult to assess because of the many variables involved, such as the differences in topography, climate, soils, vegetation types, ground cover, and stocking rates. Runoff was estimated for hypothetical watersheds consisting of key range sites. The range sites were chosen based on the following criteria: (a) they represented the largest percent of Federal acres and (b) they represented the primary range sites where vegetation treatments would occur.

When assessing the impacts of the different alternatives on surface runoff, several assumptions were made:

1. two square mile watersheds, dominated by one range site

2. 25 year; 6 hour storm event

3. 10 percent slope on limestone hills range sites; 5 percent slope on gravelly, loamy, and shallow loamy range sites; 7 percent slope on shallow range sites; 2 percent on shallow sandy range sites

4. existing and predicted ground cover taken from range inventory data, based on average for each key range site

SURFACE RUNOFF FOR KEY RANGE SITES

Key Range Sites	Condition Class			
	Excellent	Good	Fair	Poor
Southern Desert-3				
Gravelly				
Peak Rate (cfs)	742	742	846	960
Volume (ac-ft)	134	134	149	165
Loamy				
Peak Rate (cfs)	286	337	425	527
Volume (ac-ft)	62	71	86	102
Limestone Hills				
Peak Rate (cfs)	-0-	1,034	1,083	1,166
Volume (ac-ft)	-0-	173	182	191
Shallow Sandy				
Peak Rate (cfs)	304	330	417	564
Volume (ac-ft)	76	81	97	121
Western Plains				
Shallow				
Peak Rate (cfs)	868	921	1,032	1,087
Volume (ac-ft)	149	157	173	182
Canadian-Pecos Plains				
Limestone Hills				
Peak Rate (cfs)	-0-	982	1,034	1,083
Volume (ac-ft)	-0-	165	173	182
Shallow Loamy				
Peak Rate (cfs)	-0-	311	365	425
Volume (ac-ft)	-0-	66	76	86

Source: BLM Las Cruces District Office Files, 1984.
Soil Conservation Service, 1972.

Notes: cfs -- cubic feet per second.
ac-ft -- acre-feet.

APPENDIX B-2

WATER QUALITY CRITERIA
FOR LIVESTOCK AND WILDLIFE USE

Parameter	Recommended Upper Limit
Salinity	7,000 mg/l
Chloride	1,500 mg/l
Fluoride	2.0 mg/l
Sulfate	1,000 mg/l
Nitrate	100 mg/l
Nitrite	10 mg/l
Arsenic	0.2 mg/l
Boron	5 mg/l
Mercury	0.01 mg/l
Selenium	0.05 mg/l
Zinc	25 mg/l

Sources: Federal Water Pollution Control Administration, 1968.
Environmental Protection Agency, 1972.

Note: mg/l -- milligrams per liter.

APPENDIX B-3

WATER QUALITY STANDARDS FOR GROUND WATER
OF 10,000 MG/L TOTAL DISSOLVED SOLIDS CONCENTRATION OR LESS

Water Contaminant	Standard
Human Health Standards	
Arsenic	0.1 mg/l
Barium	1 mg/l
Cadmium	0.01 mg/l
Chromium	0.05 mg/l
Cyanide	0.2 mg/l
Fluoride	1.6 mg/l
Lead	0.05 mg/l
Total Mercury	0.002 mg/l
Nitrate	10 mg/l
Selenium	0.05 mg/l
Silver	0.05 mg/l
Uranium	5 mg/l
Radioactivity	
Combined Radium-226 and Radium-228	30 pCi/l
Benzene	0.01 mg/l
Polyclorinated biphenyls	0.001 mg/l
Toluene	15 mg/l
Carbon Tetrachloride	0.01 mg/l
1,2-dichloroethane	0.02 mg/l
1,1-dichloreothylene	0.005 mg/l
1,1,2,2-tetrachloroethylene	0.02 mg/l
1,1,2-trichoroethylene	0.1 mg/l
Other Standards for Domestic Water Supply	
Chloride	250 mg/l
Copper	1.0 mg/l
Iron	1.0 mg/l
Manganese	0.2 mg/l
Phenols	0.005 mg/l
Sulfate	600 mg/l
Total Dissolved Solids	1,000 mg/l
Zinc	10 mg/l
pH	between 6 and 9
Standards for Irrigation Use	
Aluminum	5 mg/l
Boron	0.75 mg/l
Cobalt	0.05 mg/l
Molybdenum	1 mg/l
Nickel	0.2 mg/l

Source: New Mexico Water Quality Control Commission Regulations as Amended through January 29, 1982.

Notes: mg/l -- milligrams per liter.
pCi/l -- picocuries per liter.

APPENDIX C

VEGETATION

APPENDIX C-1

SUMMARY OF PROPOSED VEGETATION TREATMENTS ON PUBLIC LAND[a/]
BALANCED ALTERNATIVE

Allotment Number	Chemical Treatment (acres)		Additional AUMs Available to Livestock Through Treatment	Burning[b/]
	Creosotebush	Mixed Desert Shrub		
7033				77
7055	1,780		120	
7067	304		41	
9001	1,688		374	
9002	1,399		85	105
9003	640		86	
9010	7,985		1,289	
9013	1,282		207	
9026	2,629		355	
9031		2,500	769	
9035	9,525		457	1,719
9037	1,456		202	
9040	3,865		197	
9046	2,510		87	
9049	4,039		358	400
9051				80
9053	5,188	3,124	961	
9055	538		19	
9056	1,137		39	
9063	7,153		371	
TOTAL	53,118	5,624	6,017	2,381
Estimated Cost Per Acre	$27.42	$27.42		$4.00
Estimated Total Cost	$1,456,495.56	$154,210.08		$9,524.00

Source: BLM Las Cruces District Office Files, 1984.

Notes: a/In addition, seeding is proposed on allotments 7005 (10 acres) and 9023 (1,587 acres).
b/Burning and seeding will not contribute additional AUMs to livestock.

APPENDIX C-2

SUMMARY OF PROPOSED VEGETATION TREATMENTS ON PUBLIC LAND[a]
PRODUCTION ALTERNATIVE

Allotment Number	Chemical Treatment (acres)[b]			Additional AUMs Available to Livestock Through Treatment	Burning[c]
	Creosotebush	Mesquite	Mixed Desert Shrub		
7033					77
*7034		14,389		1,087	
7037	7,992	16,245		1,702	
7039		5,171		411	
7050	6,659	467		477	
7051		3,230		257	
7055	1,780			120	
7067	305			41	
9001	1,688			374	
9002	1,398			85	105
9003	640			86	
9004	1,604			56	
*9006	1,354			47	
9009	998			35	
9010	7,985			1,290	
9011	1,954			109	
9012	1,547			76	
9013	1,282			207	
9014	1,544			204	
9018	4,520			865	
9020	3,235			187	
9025	457			25	
9026	2,629			355	
9027	1,094			104	
9028	1,179			150	
9029	639			35	
9030	1,285			56	
9031			2,500	769	
9033	3,429			148	
9035	9,525			456	1,719

APPENDIX C-2 (concluded)

SUMMARY OF PROPOSED VEGETATION TREATMENTS ON PUBLIC LAND[a]
PRODUCTION ALTERNATIVE

Allotment Number	Chemical Treatment (acres)[b]			Additional AUMs Available to Livestock Through Treatment	Burning[c]
	Creosotebush	Mesquite	Mixed Desert Shrub		
9036	1,082			49	
9037	1,456			202	
9038	1,324			70	
9039	2,257			110	
9040	3,866			196	
9042	1,942			87	
9046	2,510			87	
9047	611			46	
9049	4,039			358	400
9051					80
9053	5,188		3,124	961	
9055	538			19	
9056	1,137			39	
9063	7,154			372	
9064	163			7	
TOTAL	99,989	39,502	5,624	12,417	2,381
Estimated Cost Per Acre	$27.42	$27.42	$27.42		$4.00
Estimated Total Cost	$2,741,698.38	$1,083,144.84	$154,210.08		$9,524.00

Source: BLM Las Cruces District Office Files, 1984.

Notes: *Indicates allotments with Allotment Management Plans.
a/In addition, seeding is proposed on allotments 7005 (10 acres) and 9023 (1,587 acres).
b/Acreage figures include treatment acres from the Balanced Alternative.
c/Burning and seeding will not contribute additional AUMs to livestock.

APPENDIX C-3

GUIDELINES FOR VEGETATION TREATMENTS

Specifics on the methods to be used during the application of herbicides are as follows.

1. Aerial applications of liquid herbicides would make use of aircraft with positive shutoff spray systems, special drift reduction nozzles, and spray mix adjuvants to apply herbicides to the specific target areas. Aerial applications would be accomplished under a contract to be let through competitive bidding processes. These applications would take place between mid-May and the first of July.

2. Aerial applications of granular herbicides would also make use of aircraft with a positive shutoff application chute. All aerial dispersion would be accomplished by contractors. These herbicide applications could take place anytime during the year depending on research recommendations.

Policies and laws that would be followed in the proposed brush control with herbicides program are:

1. Environmental impacts would be identified through a site-specific environmental assessment and measures taken to mitigate potentially adverse environmental impacts for each specific treatment location.

2. Programs would be reviewed with user groups, interested organizations, and the general public.

3. Only Federally-registered herbicides would be used on public land except as authorized by Section 24.c., Public Law 92-516, the Federal Environmental Pesticide Control Act of 1972. Section 24.c. provides for State registration of certain herbicides for local needs within the State. Any herbicide proposal planned under a State registration would include a copy of the State label.

4. Tank mixes of herbicides may be approved if: such mixture is provided for on one or more labels of Environmental Protection Agency (EPA)-registered products; provided for under a State registration; or if the tank mix has been tested and has a written recommendation by an Agricultural Experiment Station or the State Department of Agriculture. The herbicides recommended in the mixture must be applied at a dosage rate not to exceed the label instructions for use of any single product for the same target species and must not be specifically prohibited from mixing on either label. Each tank mix proposal must be accompanied by appropriate labels or a written recommendation.

5. Integrated brush control methods which may combine chemical, manual, mechanical, or biological control techniques will be used where they meet the objectives of the project and minimize the adverse impact of brush control.

6. All proposed use of herbicides on public land would be reviewed for approval in advance by the Bureau's Washington, D.C. Office.

7. Federal and State agencies with responsibilities for the environment, public health, and fish and wildlife would be informed of programs and cooperative measures developed when necessary.

8. Only properly trained or licensed personnel would handle and use herbicides on public land. This includes applications by permittees, grantees, or licensees. At least one member of the application crew and the BLM on-the-ground supervisor must be a certified applicator.

9. All individuals associated with the handling or application of herbicides on public land would be familiar with emergency procedures to be used in case of a herbicide spill.

There would be specific measures included in the design of each proposed herbicide project in order to minimize adverse impacts on the environment. They include the following:

1. On herbicide application projects conducted directly by BLM personnel, an employee holding a valid herbicide application certification would monitor and supervise the project. Work done by contractors would be carried out by individuals having a valid State certification.

2. Contracts for application would require that the intake operation of water for mixing shall be arranged so that an air gap or reservoir will be placed between the live water intake and the mixed tank to prevent any backflow of chemical into the water source.

3. Contracts for application would require that contractors not wash out any spray tanks in or near any streams or dispose of any chemical containers on the public land.

4. During aerial spraying, spray would be turned off at the end of spray runs and during the time when a turn is being made to start another spray run. Initial spray swaths along buffer strips or other areas to be protected would be made parallel to these areas before spraying commences on the rest of the project area.

5. Mixing and loading operations would take place in an area where an accidental spill would not flow into a stream or body of water.

6. Contained surface waters such as earthen stock tanks, drinking troughs, etc., would be protected by a buffer strip or could be covered to eliminate surface water contamination. A buffer strip of 1,500 feet adjacent to perennial streams would be established. This would apply to areas adjacent to the perennial streams, ranch houses, known locations of threatened or endangered plants, identified cliffs, nests of birds of prey (where they cannot be protected), or major ephemeral drainages to surface water resources.

7. To minimize drift and volatilization, aerial applications of all the liquid herbicides proposed for use would be confined to periods when wind speed is less than 7 miles per hour, air temperature is under 85° F, precipitation is not occurring or imminent, and air turbulence would not affect normal spray patterns. Label directions would be followed if they require additional restrictions. Low volatile formulations would be used.

8. Daily measurements of weather conditions would be made by trained personnel at spray sites during liquid application. Additional measurements would be made at any time that a weather change appears to be taking place which could jeopardize safe placement of the spray on the target area.

9. Spray aircraft would normally be required to fly at an air speed of less than 100 miles per hour and less than 50 feet above the vegetation unless obstructions are encountered. Nozzle size and pressure would be designed to produce droplets with a diameter of 200-500 microns. All aerial nozzles would be equipped with automatic shutoff devices to prevent loss of herbicide along nonspray flight routes. Spray mixtures would contain drift reduction adjuvants where they would be effective. Herbicide pellets and granules aerially applied would require the aircraft to fly at an air speed of less than 125 miles per hour.

10. During air operations, a radio network would be maintained which links all parts of the project. Reconnaissance flights would be made before spraying begins to orient pilots as to locations of sensitive areas which are adjacent to spray targets.

11. All livestock would be removed from treated pastures prior to aerial spraying.

12. Grazing would not be permitted in treated pastures for a minimum of two growing seasons or 16 months following treatment. Applications would be in strict conformity with label instructions. Each applicator would be trained in the correct operation of spray equipment, prevention of plumbing leaks, safe handling and mixing of herbicides, control of application rate, and would be supervised by licensed personnel.

The overall responsibility for monitoring environmental impacts of chemical herbicides rests with the EPA (Public Law 92-516, Section 20). Research on environmental impacts of herbicides to animals, water, soils, and plants is conducted by chemical companies as a prerequisite to registration with the EPA. Additional research is conducted by Federal agencies and universities. The BLM would keep abreast of these research findings and adjust its proposed herbicide applications as indicated by research results and EPA recommendations.

Vegetation response would be monitored with appropriate photostations and vegetation sampling transects being established prior to treatment. On-site data evaluating herbicide effectiveness and the resulting secondary succession would be collected to continually improve the brush control process.

The safe use of herbicides includes precautionary measures to prevent accidental spills. The following precautions describe the measures that would be used to reduce the chance of such accidents and the emergency actions which would be required if an accidental spill should occur. The applicable Federal regulations concerning the storage and disposal of herbicides and herbicide containers would be followed. These are described in the EPA "Regulations for Acceptance and Procedures for Disposal and Storage," Federal Register, May 1, 1974, pages 15236 through 15241.

During Transportation

1. It is essential to prevent damage to containers so that leaks do not develop. Care would be exercised so that the containers are not punctured or ruptured and so that the lids or caps are not loosened.

2. Precautions would be taken in the loading and stacking of herbicide containers on the transporting vehicle to ensure that containers are tied down so that they do not fall when the vehicle moves.

3. Open containers would never be transported. Containers which are partially empty would be securely resealed before transport.

4. After transportation, all herbicide containers would be inspected for damage and leaks and the vehicle must be carefully examined for contamination.

During Application

1. Spraying schedules would be arranged so that poor visibility before and shortly after sunrise and sunset would not seriously affect the safety of the pilot.

2. Spraying from a higher altitude would be allowed where steep terrain in the spray area would make it hazardous to spray at the specified contract heights.

3. The pilot would be instructed to stop spraying when, in his own judgment, conditions are too hazardous.

4. The pilot would be instructed to fly at a height above the ground that would produce effective treatment results. In no case should the minimum flight height be less than 5 feet.

5. Pilots would be cautioned about dangers such as topographic features. Project maps would be reviewed with each pilot, paying particular attention to landing strips, areas being sprayed, and approaches to and from those areas.

6. Pilots would be cautioned as the location of telephone and electric lines near any landing strip which would be used.

7. If an aircraft crashes, the pilot's clothing would be checked to see if he has been splashed with herbicide. If so, and if he is to seriously injured, he would be washed several times with soap.

8. Should a pilot be injured and taken to a hospital or doctor, they would be informed that the pilot has been exposed to a herbicide and they would be provided with any herbicide label information that is available.

Tanker Precautions

1. An air gap or reservoir between the water source and the mixing tank would be required. A separate portable pump may be used.

2. Spray solutions would be mixed away from streams, drains, or ditches leading to streams where spills could reach a stream if they occurred.

3. The movement of loaded herbicide tankers would be planned to minimize travel adjacent to streams.

If Spills Occur

In the event of a spill, the project inspector or crew foreman would immediately implement measures to contain the herbicide. The following individuals would be notified as soon as possible: (a) the Area Manager, (b) the District Manager, (c) the State Office herbicide-use coordinator, and (d) the New Mexico Department of Agriculture, Herbicide Regulation Division.

1. Herbicides would be contained by diking and collecting pools. The location and availability of earthmoving equipment close to the project would be noted.

2. The EPA would be notified immediately if a major spill should occur.

3. The surrounding area would be inspected for contamination.

Criteria used in the selection of herbicides are based on guidelines and policies issued by the U.S. Department of the Interior. These criteria are briefly outlined in the following discussion.

1. The chemical proposed for use is not prohibited by the U.S. Department of the Interior.

2. Use of any chemical is aimed at a specific brush problem and involves both minimum strength and frequency of application.

3. Chemical herbicides would not be used alone when nonchemical or integrated chemical and nonchemical techniques offer an environmentally feasible alternative.

4. No herbicide would be used when there is evidence to show that:

a. Water quality would be degraded.

b. Hazards exist that would unnecessarily threaten fish, wildlife, their food chain, or other components of the natural environment.

5. Herbicides proposed for use must be registered by the EPA according to Public Law 92-516. This law requires a determination by EPA that the chemical "will perform its intended function without unreasonable adverse effects on the environment." If registration of any herbicide is revoked or modified for rangeland use by the EPA, use of that herbicide by the BLM will be terminated or modified accordingly.

APPENDIX C-4

METHODOLOGY
MODIFIED SOIL-VEGETATION INVENTORY AND DIGITIZING

Instructions for completing the modified soil-vegetation inventory, which was used for completing the vegetation inventory in the White Sands Resource Area, are described in BLM Manual 4412.14.

This procedure can be described in six distinct phases: typing or mapping, transecting, digitizing, cross-correlation, compilation, and computation.

Typing or mapping was done by soil-vegetation units on aerial photographs. Vegetation was typed according to dominant species aspect. These units were then further divided to delineate areas with similar plant species composition and density. The final mapping unit was an area of similar vegetation occurring on the same soil and range site. These units were then called Site Write-Up Areas (SWAs).

Not all SWAs were sampled or transected during this inventory. The area was stratified based on range site, vegetation subtype, and condition class determined from an estimate of production by species during the typing process. From this information, similar SWAs were grouped together based on similar species. These groups were low poor, high poor, low fair, high fair, low good, high good, and low excellent. A certain percentage of each group was then transected. From this transect data, the ecological condition class for each SWA was determined based on the group that it was in. A minimum of one 100-point pace transect was done on each SWA. Information recorded at each 100 points along the line includes basal hits identifying ground cover as live vegetation, litter, small rock, large rock, and bare ground. Live vegetation was identified by plant species. Hits were identified by a notch on the toe of the sole of the transector's boot, 1/8 inch wide and 1/16 inch deep. Canopy vegetation cover, if present, was recorded up to three levels above the boot.

Information on vegetation production was obtained at three evenly spaced plots across the SWA along the transect line. Weight-estimate plots of 9.6 or 96.0 square feet were used. At least one of the three plots were clipped and weighed. A utilization adjustment was made to compensate for any grazing use made on plants prior to the time of the field sampling. The final calculations computed total production of each vegetation species by converting grams per plot to pounds per acre. Green weight in grams for each plant species occurring in the plot was recorded. Adjustment factors used to convert green weights to dry weights were determined from samples collected during the inventory, air dried, and percentages of dry weight to green weight calculated.

Compilation of acres by land status for each SWA, allotment, range site, vegetation subtype, and condition class was done through the BLM digitizing system. Land status was transferred to U.S. Geological Survey (USGS) topographic maps and entered into the system as Overlay 1.

Allotments and SWAs were entered on consecutive overlays. The digitizing system computed acres by superimposing these overlays to give acres by land status, SWA, and allotment, or a combination of these. This system was further refined with cross-correlation programs so acres could be retrieved by range site, vegetation subtype, and condition class.

Vegetative mathematical computations were done by the BLM computer system. The first calculation converted green weight in grams to dry weight in pounds.

APPENDIX C-5

METHODOLOGY
FORAGE VALUE CLASS

The forage value ratings were determined using procedures described in BLM Instruction Memorandum No. 74-120 with certain modifications. The criteria relative to soil surface factors were omitted and only those pertaining to quality and quantity of the vegetation were considered.

Major plant species in the White Sands Resource Area were classified into three categories: desirable, intermediate, and least desirable. This classification was based on palatability and productivity, dominance under climax or near climax conditions, longevity of the species, and the importance of the species to improving rangeland conditions.

Standards used to determine forage value ratings are as follows:

1. Good Condition. Composition is 40 percent or more of both desirable and intermediate species with at least 20 percent made up of desirable species.

2. Fair Condition. Composition is 15-39 percent of desirable and intermediate species with 5 or more percent made up of desirable species. Also, composition is 60 percent or more of both desirable and intermediate species with less than 5 percent desirables.

3. Poor Condition. Composition is less than 15 percent desirable and intermediate species.

Vegetation has different values for different kinds of grazing animals; what may be called good for one animal species may not be for others. The plant species shown in the desirable and intermediate category below are for cattle only. Major plant species not shown were placed in the least desirable category.

DESIRABLE

Grasses

Sideoats Grama
Black Grama
Blue Grama
Hairy Grama
Purple Grama
Bermuda Grass
Arizona Cottontop
Plains Lovegrass
Tanglehead
Curly Mesquite
Junegrass
Wolftail
Sand Muhly
Arizona Muhly
Mountain Muhly
Mesa Muhly
Bush Muhly
Green Spangletop
Arizona Panic Grass
Vine-Mesquite
Spike Dropseed
Mesa Dropseed
Sand Dropseed
Southwestern Needlegrass
New Mexico Feathergrass

Shrubs and Half Shrubs

Fourwing Saltbush
Desert Buckbrush
Mountain Mahogany
Wright Buckwheat
Winterfat

INTERMEDIATE

Grasses

Bluestem
Little Bluestem
Cane Bluestem
Silver Bluestem
Rothrock Grama
Fingergrass
Windmill Grass
Saltgrass
Spike Pappusgrass
Tobosa
Bullgrass
Spike Muhly
Switchgrass
Bottlebrush Squirreltail
Alkali Sacaton
Hall's Panic Grass
Giant Dropseed
Sacaton
Slim Tridens
Plains Bristlegrass

Shrubs and Half Shrubs

Sand Sagebrush
Fringed Sagebrush
Tubercled Saltbush
Obovate-Leaf Saltbush
False Mesquite
Buckbrush
Feather Peabush
Torrey Ephedra
Mexican Tea
Apacheplume
Cliff Fendlerbush
Wright Silktassel
Range Ratany
Bull Cods

APPENDIX C-6

METHODOLOGY
ECOLOGICAL CONDITION CLASS

The ecological condition on areas within a range site was determined by comparing the present plant community with the climax plant community. Potential plant communities on all range sites are described in Technical Guides available from the USDA Soil Conservation Service (1980).

Four classes are used to express the degree to which the composition of the present plant community reflects that of the climax community (SCS 1976). The four classes are:

Rangeland Condition Class	Percentage of Present Plant Community that is Climax for the Range Site
Excellent	76 - 100
Good	51 - 75
Fair	26 - 50
Poor	0 - 25

Percent composition of each species for the existing plant community cannot exceed the percent composition of the same species in climax, as shown in the guide for the climax plant community. The amount of all climax species not in excess of that shown on the guide is totaled to indicate the relative ecological condition rating. This rating will be between 0 and 100. An example of the calculations for a loamy range site occurring in the Southern Desert Major Land Resource Area is shown below.

Plant	Maximum Percent Composition	Present Percent Composition	Adjusted Percent Composition
Aristida	10	3	3
Sideoats Grama	5	1	1
Blue Grama	30	87	30
Broom Snakeweed	3	6	3
Mesquite	3	2	2
TOTAL			39

The total adjusted rating was 39, which indicates a fair ecological condition class rating. The primary reason for a low rating of 39 for this site was the lack of other species which would occur in a climax plant community.

No adjustments were made for total weight of forage produced compared with the potential; therefore, the condition class ratings used are not based upon the variations in total production for any specific site and only reflect plant species compositions.

APPENDIX C-7

METHODOLOGY
APPARENT TREND

The trend in rangeland condition can only be determined by measuring changes over time. Generally, the longer the time, the greater the confidence in trend determinations. However, in some cases, it may be necessary to establish what the existing trend is before long-term trend data are available. The apparent trend study is used to determine the direction of change with a single observation. Apparent trend is an estimate of current trend based on indicators of current changes occurring in the vegetation and soil condition. The five factors involved are vegetation (either seeded or native), vigor, seedlings, surface litter, and soil movement. A numerical rating is assigned for each factor and a composite rating is determined. The Observed Apparent Trend Worksheet, Form AT-1, is used to record this data. (See Illustration 2-1.)

Illustration 2-1

Form AT-1

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OBSERVED APPARENT TREND
WORKSHEET

Planning Unit _____
Allotment _____
Location _____
Examiner _____
Vegetative Type _____
Date _____

SWA No. _____
Transect No.

		Possible Points	Rating
* 1.A. VEGETATION SEEDED	More than 50 percent of the total vegetation is composed of the seeded species. If shrubs are present, the seeded species occur mainly in open spaces between shrubs. Undesirable annual vegetation is absent or nearly so.	6	
	25 to 50 percent of the vegetation is composed of the seeded species. If shrubs are present, some seeded species occur in open unprotected areas. Limited amounts of undesirable annual vegetation are present.	4	
	Less than 25 percent of the vegetation is composed of the seeded species. Seeded species are generally protected by shrubs or rocks. There is an over abundance of undesirable annuals and/or shrubs.	2	
* 1.B. VEGETATION NATIVE	More than 50 percent of the total vegetation is composed of the potential natural vegetation. An evenly distributed mixture of grasses, forbs, and shrubs are present. Major native forage grasses occur in open, unprotected areas. Undesirable annual vegetation is absent or nearly so. Browse species showing no hedging.	6	
	25 to 50 percent of the vegetation is composed of the potential natural vegetation. Moderate variations of grasses, forbs, and shrubs exist. Some major native forage grasses occur in open, unprotected areas. Limited amounts of undesirable annual vegetation are present. Browse species showing moderate hedging.	4	
	Less than 25 percent of the vegetation is composed of the potential natural vegetation. Poor variation exists among grasses, forbs, and shrubs, with an over abundance of undesirable annuals or shrubs. Major native forage species are generally protected by shrubs or rocks. Browse species showing heavy hedging.	2	
2. VIGOR	Desirable grasses, forbs and shrubs are vigorous showing good health. These plants should have good size, color, and produce abundant herbage.	10	
	Desirable grasses, forbs, and shrubs have moderate vigor. They are medium size with fair color and producing moderate amounts of herbage, some seed stalks and seedheads are present.	6	
	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seedheads almost non-existent except in protected areas.	2	
3. SEEDLINGS	There is seedling establishment of desirable grasses, forbs, and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.	10	
	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.	6	
	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.	2	
4. SURFACE LITTER	Surface litter is accumulating in place.	5	
	Moderate movement of surface litter is apparent and deposited against obstacles.	4	
	Very little surface litter is remaining.	3	
5. SOIL MOVEMENT	None or slight visual evidence of soil movement. No exposed roots.	5	
	Moderate movement of soil particles visible. Some plants have roots exposed.	3	
	Movement occurs with each event. Soil and debris deposited against minor obstructions. Terracing may be present. Many plants have roots exposed.	1	
	*Record vegetation as either seeded or native, not for both.	Total	

7-16 Downward
17-26 Static (not apparent)
27-36 Upward

General Remarks:

Source: BLM New Mexico Rangeland Studies Handbook, Supplemental Studies (Manual 4440)

APPENDIX C-8

METHODOLOGY
DETERMINATION OF THE ESTIMATED ACRE CHANGES
FOR EACH ECOLOGICAL CONDITION AND FORAGE VALUE CLASS

Estimated acre changes were determined for all the various alternatives based on the different intensities of grazing use and the chemical vegetation treatments proposed. This determination was made on vegetation subtypes on each different range site for the different ecological condition classes which contained data from the field inventory (Appendix C-10).

Changes which were projected to occur in the acres in each ecological condition and forage value class were based on the potential which exists for each site write-up area and the projected change in production and percent of the total composition comprised of desirable and intermediate forage species for the various alternatives. On some areas, the existing vegetation and low potential would preclude any improvement.

Based on the point system of 0-25 being poor, 26-50 fair, 51-75 good, and 76-100 excellent for the four ecological condition classes, the projected changes for the various alternatives were determined as follows:

Balanced Alternative. No improvement on areas with a 0-10 rating. Improvement from poor to fair with a 16-25 rating and fair to good with a 41-50 rating. In addition, those areas receiving chemical vegetation treatments were raised one condition class based on the projected decrease in brush-type vegetation and increase in grass species.

Production Alternative. Same as the Balanced Alternative. In addition, those areas receiving chemical vegetation treatments were raised one condition class based on the projected decrease in brush-type vegetation and increase in grass species.

No Action Alternative. Decline from fair to poor on areas with a 26-30 rating and good to fair with a 51-55 rating.

No Livestock Grazing Alternative. Improvement from poor to fair with a 11-25 rating and fair to good with a 36-50 rating.

Protection Alternative. A midpoint between the Balanced Alternative and the No Livestock Grazing Alternative was used.

The projected changes in the forage value classes were based on a ratio of acres in poor ecological condition to acres in poor forage value, acres in fair ecological condition to acres in fair forage value, and acres in good ecological condition to acres in good forage value which exists at the present time and using the same ratios for the projected changes under the various alternatives. All changes under any of the alternatives are the projected changes which would occur by the year 2006.

APPENDIX C-9

MAJOR PLANT SPECIES IDENTIFIED IN OTERO AND PARTS OF LINCOLN, EDDY, AND CHAVES COUNTIES[a]

Plant Persistence[b]	Scientific Name	Common Name
	GRASSES	
P	Aristida spp.	Threeawn
P	Bothriochloa barbinodis	Cane Bluestem
P	saccharoides	Silver Bluestem
A	Bouteloua barbata	Six Weeks Grama
P	curtipendula	Sideoats Grama
P	eriopoda	Black Grama
P	gracilis	Blue Grama
P	hirsuta	Hairy Grama
P	Digitaria californica	Arizona Cottontop
P	Distichlis spicata	Seashore Saltgrass
P	Enneapogon desvauxii	Spike Pappusgrass
P	Eragrostis spp.	Lovegrass
P	Erioneuron pulchellum	Fluffgrass
P	Hilaria jamesii	Galleta
P	mutica	Tobosa
P	Leptochloa dubia	Green Sprangletop
P	Lycurus phleoides	Wolftail
P	Muhlenbergia spp.	Muhly
P	arenacea	Ear Muhly
P	arenicola	Sand Muhly
P	arizonica	Arizona Muhly
P	porteri	Bush Muhly
P	repens	Red Muhly
P	richardsonis	Mat Muhly
P	setifolia	Curlyleaf Muhly
P	torreyi	Ring Muhly
P	wrightii	Spike Muhly
P	Panicum hallii	Hall's Panic
P	obtusum	Vine-Mesquite
P	Scleropogon brevifolius	Burrograss
P	Setaria macrostachya	Plains Bristlegrass
P	Sitanion hystrix	Bottlebrush Squirreltail
P	Sporobolus spp.	Dropseed
P	airoides	Alkali Sacaton
P	contractus	Spike Dropseed
P	cryptandrus	Sand Dropseed
P	flexuosus	Mesa Dropseed
P	nealleyi	Gyp Dropseed
P	wrightii	Sacaton
P	Stipa spp.	Needlegrass
P	Tridens spp.	Tridens
P	muticus	Slim Tridens
A	Annual Grass	Annual Grasses
P	Perennial Grass	Perennial Grasses

Plant Persistence[b/]	Scientific Name	Common Name
	FORBS	
P	Amsonia arenaria	Broncoweed
P	Bahia absinthifolia	Hairyseed bahia
P	Coldenia spp.	Coldenia
P	Croton spp.	Croton
P	Dyssodia pentachaeta	Common Dogweed
P	Eriogonum spp.	Wild Buckwheat
P	Hoffmanseggia glauca	Indian Rushpea
P	Juglans spp.	Ash
P	Lepidium spp.	Pepperweed
P	montanum	Mountain Pepperweed
P	Lesquerella spp.	Bladderpod
P	Perezia nana	Desert Holly
A	Salsola kali	Tumbleweed
P	Sphaeralcea spp.	Globemallow
P	angustifolia	Narrowleaf Globemallow
P	Suaeda spp.	Seepweed
A	Annual Forb	Annual Forbs
P	Perennial Forb	Perennial Forbs
	SHRUBS, HALF SHRUBS, TREES, AND CACTI	
S	Acacia greggii	Catclaw acacia
S	Agave spp.	Century Plant
S	Allenrolfea occidentalis	Iodine Bush
S	Aloysia wrightii	Wright Spicebush
S	Artemisia filifolia	Sand Sagebrush
HS	ludoviciana	Sagewort
S	Atriplex canescens	Fourwing Saltbush
S	Baccharis spp.	Baccharis
S	pteronioides	Yerbadepasmo Baccharis
S	Berberis spp.	Barberry
S	trifoliolata	Algerita
S	Brickellia spp.	Brickelbush
S	californica	California Brickelbush
S	laciniata	Splitleaf Brickelbush
S	Cercocarpus spp.	Mountain Mahogany
S	montanus	True Mountain Mahogany
S	Choisya arizonica	Starleaf
T	Chiplosis linearis	Desert Willow
S	Chrysothamnus nauseosus	Rubber Rabbitbrush
HS	Coldenia canescens	Spreading Coldenia
S	Condalia ericoides	Javelina Bush
S	Dalea formosa	Feather Peabush
S	Dasylirion wheeleri	Wheeler Sotol
HS	Dyssodia acerosa	Prickleleaf Dogweed
S	Ephedra spp.	Ephedra
S	torreyana	Torrey Ephedra
S	trifurca	Mexican Tea

Plant Persistence b/	Scientific Name	Common Name
	SHRUBS, HALF SHRUBS, TREES, AND CACTI (continued)	
S	Eurotia lanata	Winterfat
S	Fallugia paradoxa	Apacheplume
S	Flourensia cernua	Tarbush
S	Fouquieria splendens	Ocotillo
T	Fraxinus spp.	Ash
S	Gutierrezia sarothrae	Broom Snakeweed
S	Hymenoclea monogyra	Burrobush
T	Juniperus deppeana	Alligator Juniper
T	monosperma	One-Seeded Juniper
S	Koeberlinia spinosa	Crown-of-Thorns
S	Krameria parvifolia	Range Ratany
S	Larrea divaricata	Creosotebush
S	Lycium pallidum	Pale Wolfberry
S	Nolina spp.	Beargrass
S	texana	Texas Sacahuista
C	Opuntia spp.	Pricklypear and Cholla
C	engelmannii	Engelmann Pricklypear
C	imbricata	Walkingstick Cholla
C	leptocaulis	Christmas Cactus
S	Parthenium incanum	Mariola
S	Prosopis glandulosa	Honey Mesquite
S	Quercus spp.	Oak
S	Rhus aromatica	Skunkbush
S	microphylla	Littleleaf Sumac
S	Salix spp.	Willow
S	Senecio spp.	Groundsel
HS	longilobus	Threadleaf Groundsel
HS	Viguiera longifolia	Longleaf Goldeneye
S	stenoloba	Slimleaf Goldeneye
S	Yucca spp.	Yucca
S	baccata	Datil Yucca
T	elata	Soaptree Yucca
T	torreyi	Torrey Yucca
S	Zizyphus obtusifolia	Graythorn

Source: BLM Las Cruces District Inventory Data, 1983-1984.

Notes: a/A complete list of plant species found during the 1982 Range Inventory is available for review in the Las Cruces District Office. For major plant species identified in Sierra County, see the Grazing Environmental Impact Statement Southern Rio Grande Planning Area, 1981.

b/ A - Annual
P - Perennial
C - Cacti
HS - Half Shrub
S - Shrub
T - Tree

APPENDIX C-10

AVERAGE PRODUCTION AND PLANT COMPOSITION

Vegetation Subtype	Ecological Condition Class	Forage Value Class	Pounds Vegetation Production (per acre)	Percent Composition by Weight a/ Grasses D	Grasses I	Grasses L	Shrubs D	Shrubs I	Shrubs L	Forbs
SOUTHERN DESERT MLRA 42-SD2										
Gravelly Range Site -- D42X010NTX										
Creosotebush	4b/ Poor	Poor	188	1		1			88	11
Deep Sand Range Site -- D42X011NTX										
Creosotebush	1 Poor	Fair	207	21					69	9
Mesquite	4 Poor	Poor	628	1		11	11		82	7
Weighted Average c/			544							
Sandy Range Site -- D42X012NTX										
Mid-Grass	1 Fair	Good	556	46		8			37	10
Creosotebush	1 Poor	Poor	68				6		53	41
Mesquite	1 Poor	Poor	68				6		53	41
Fourwing Saltbush	2 Poor	Good	467	22			44	7	21	5
Weighted Average			325							
Loamy Range Site -- D42X014NTX										
Mid-Grass	3 Poor	Good	662	19	57	13	6		2	1
Creosotebush	4 Poor	Poor	163		6				93	2
Mesquite	4 Poor	Fair	293		16	23	14		43	4
Weighted Average			346							
Bottomland Range Site -- D42X018NTX										
Mid-Grass	1 Fair	Poor	468		56	13				30
Other Shrubs	1 Fair	Fair	384	1	49	8	16		7	18
Weighted Average			426							
Limestone Hills Range Site -- D42X021NTX										
Creosotebush	1 Fair	Good	384	52		3			41	3
Mixed Desert Shrub	3 Poor	Fair	160	12	15	2		1	67	2
	2 Fair	Good	325	40	10	8		4	33	6
Weighted Average			253							

Vegetation Subtype	Ecological Condition Class	Forage Value Class	Pounds Vegetation Production (per acre)	Percent Composition by Weight a/ Grasses D	Grasses I	Grasses L	Shrubs D	Shrubs I	Shrubs L	Forbs
SOUTHERN DESERT MLRA 42-SD2 (continued)										
Hills Range Site -- D42X027NTX										
Mid-Grass	1	Good	Good	430	70	12		12	4	2
Creosotebush	1	Poor	Poor	176	3		19	1	74	3
Mixed Desert Shrub	1	Poor	Poor	201	3	15	6		62	13
	1	Fair	Good	535	75	14			7	2
	2	Good	Good	437	69	12		6	1 10	2
Mixed Mountain Shrub	1	Poor	Good	502	79	7		1	12	1
Weighted Average				388						
Riparian Range Site -- D42X097NM[d/]										
Other Shrubs	2	Poor	Fair	305	5	50			45	
	2	Fair	Good	987	4	1	1	28	19 46	2
	3	Good	Fair	579	7	7	1	11	70	4
Weighted Average				617						
Badlands Range Site -- D42X099NM[d/]										
Creosotebush	1	Fair	Poor	211	4	23			7 37	29
Mixed Desert Shrub	2	Poor	Fair	368	25	1	1	1	1 70	2
	1	Fair	Fair	358		77			21	1
Weighted Average				327						
SOUTHERN DESERT MLRA 42-SD2 and -SD3										
Gyp Upland Range Site -- D42X006NTX										
Mid-Grass	2	Poor	Fair	912	2	92		1		6
Creosotebush	4	Poor	Poor	142	1	3	1	7	82	6
	1	Fair	Fair	220	2	26	10	6	39	17
Mesquite	3	Poor	Fair	267		40		16	44	
Fourwing Saltbush	3	Poor	Good	143	6	17	12	21	38	6
Mixed Desert Shrub	1	Poor	Good	234		49	11	23	17	
Other Shrubs	1	Poor	Poor	798			36		64	
Weighted Average				325						

Vegetation Subtype		Ecological Condition Class	Forage Value Class	Pounds Vegetation Production (per acre)	Percent Composition by Weight a/ Grasses D	Grasses I	Grasses L	Shrubs D	Shrubs I	Shrubs L	Forbs
SOUTHERN DESERT MLRA 42-SD2 and -SD3 (continued)											
Gyp Hills Range Site -- D42X013NTX											
Creosotebush	2	Poor	Fair	274	15	41	1		1	41	2
Mixed Desert Shrub	1	Poor	Poor	405	4		9			82	5
	1	Fair	Fair	116	6	31			6		58
Mixed Mountain Shrub	1	Poor	Poor	256	7		4		1	81	7
Pinyon-Juniper	1	Poor	Poor	256	7		4		1	81	7
Weighted Average				264							
Salt Flats Range Site -- D42X036N											
Mid-Grass	2	Poor	Good	69		30		51		13	6
Fourwing Saltbush	1	Poor	Fair	12				30		70	
Mixed Desert Shrub	1	Fair	Fair	492		31		5		64	1
Weighted Average				160							
Pseudoriparian Range Site -- D42X098NM d/											
Other Shrubs	10	Poor	Fair	726	10	9	3	3	3	67	4
	14	Fair	Fair	444	14	2	4	4	9	60	6
	15	Good	Fair	332	13	5	3	2	13	61	3
Weighted Average				473							
SOUTHERN DESERT MLRA 42-SD3											
Gravelly Range Site -- D42X001NTX											
Mid-Grass	1	Poor	Fair	193		86				14	
Creosotebush	8	Poor	Poor	156	2		18		1	76	2
	4	Fair	Good	254	38	2	16			39	4
	1	Good	Fair	126	34	2	12			46	6
Mixed Desert Shrub	1	Poor	Poor	119	6		31		6	56	2
Weighted Average				180							

Vegetation Subtype		Ecological Condition Class	Forage Value Class	Pounds Vegetation Production (per acre)	Percent Composition by Weight a/ Grasses D	Grasses I	Grasses L	Shrubs D	Shrubs I	Shrubs L	Forbs
SOUTHERN DESERT MLRA 42-SD3 (continued)											
Shallow Sandy Range Site -- D42X002NTX											
Mid-Grass	1	Poor	Good	187	21	45	27			4	2
	4	Fair	Good	850	63	5	6	1		21	3
	1	Good	Good	330	68	3	10			17	2
Creosotebush	1	Fair	Good	546	44	19	7		1	28	1
Mixed Desert Shrub	1	Fair	Fair	472	22	1	7			66	2
	1	Good	Good	244	58		17			21	3
Snakeweed	1	Fair	Good	747	54		8			32	5
	1	Good	Good	890	65		8			24	2
Weighted Average				620							
Sandy Range Site -- D42X004NTX											
Creosotebush	1	Poor	Poor	273	6					93	1
Mixed Desert Shrub	2	Poor	Good	134	7			34	10	48	2
Yucca	1	Poor	Poor	84			3			94	2
Weighted Average				156							
Loamy Range Site -- D42X007NTX											
Short-Grass	1	Poor	Poor	353		9	57			23	10
Mid-Grass	2	Poor	Poor	185	5	3	66			24	3
	4	Fair	Good	246	22	32	36			10	
	3	Good	Good	865	34	46	8	1		6	6
Creosotebush	11	Poor	Poor	197	2	2	21			74	1
	1	Fair	Fair	912	21	18	33			27	1
Tarbush	2	Poor	Poor	137	2	1	27			71	
	1	Fair	Fair	562	7	15	30			43	6
Fourwing Saltbush	4	Poor	Good	95		3	42	40		13	3
Mixed Desert Shrub	4	Poor	Fair	183	8	12	6	13		61	
	5	Fair	Good	510	36	23	13			26	2
	1	Good	Good	676	30	25	25			18	1
Weighted Average				322							
Draw Range Site -- D42X008NTX											
Mid-Grass	1	Poor	Fair	423		100					

Vegetation Subtype		Ecological Condition Class	Forage Value Class	Pounds Vegetation Production (per acre)	Percent Composition by Weight a/ Grasses D	Grasses I	Grasses L	Shrubs D	Shrubs I	Shrubs L	Forbs
SOUTHERN DESERT MLRA 42-SD3 (continued)											
Bottomland Range Site -- D42X017NTX											
Mid-Grass	4	Poor	Fair	1,256		77	4			19	
Creosotebush	2	Poor	Fair	143	6	2	2		41	48	2
Weighted Average				885							
Limestone Hills Range Site -- D42X020N											
Mid-Grass	4	Fair	Good	399	40	8	14			36	3
	3	Good	Good	597	72	1	7	2		16	2
Creosotebush	1	Fair	Good	137	61		7		1	20	12
Mixed Desert Shrub	1	Poor	Poor	189	7	2	23			71	
	7	Fair	Fair	313	30	2	11		3	50	4
	4	Good	Good	270	61	5	2		1	26	4
Weighted Average				350							
Shallow Range Site -- D42X025NTX											
Mid-Grass	1	Fair	Good	173	39	24	10			23	4
Creosotebush	3	Poor	Poor	199	9	2	17		3	67	2
	2	Fair	Fair	298	25	1	14		1	58	2
	3	Good	Good	507	46		8		1	42	2
Weighted Average				321							
Limy Range Site -- D42X030NTX											
Mid-Grass	2	Poor	Fair	178	10	24	41	4		13	11
	2	Fair	Good	713	72					24	5
Creosotebush	1	Fair	Good	155	48	1	3			44	3
Mesquite	1	Fair	Good	306	35	2	10	4		46	4
Fourwing Saltbush	1	Poor	Good	509			3	90		3	4
Mixed Desert Shrub	1	Fair	Good	630	57		11	3		26	2
Weighted Average				423							

Vegetation Subtype		Ecological Condition Class	Forage Value Class	Pounds Vegetation Production (per acre)	Percent Composition by Weight a/ Grasses D	Grasses I	Grasses L	Shrubs D	Shrubs I	Shrubs L	Forbs
CANADIAN-PECOS PLAINS MLRA 70-CP4											
Limestone Hills Range Site -- G70X151N											
Mid-Grass	2	Poor	Fair	275	19	3	19		1	56	2
	3	Fair	Good	298	35	6	15			42	1
Mixed Desert Shrub	1	Fair	Good	219	35	16	1	4		41	2
Mixed Mountain Shrub	1	Poor	Fair	109	20	1	9	12	6	52	
	2	Fair	Good	272	62	8	1	1	2	24	3
	1	Good	Good	217	68	1	13	2	5	7	3
Snakeweed	1	Fair	Fair	504	23	5	14			54	3
Pinyon-Juniper	1	Poor	Fair	407	31		2		1	62	3
	3	Fair	Good	317	37	2	16	8		33	3
Weighted Average				293							
Shallow Range Site -- G70X152N											
Mid-Grass	1	Poor	Poor	99			13			86	
Mixed Mountain Shrub	1	Fair	Good	243	51	18	12			20	
Weighted Average				171							
Loamy Range Site -- G70X153N											
Short-Grass	1	Poor	Poor	190	6		47			46	
Mid-Grass	1	Poor	Fair	1,869	4	88	4				1
	2	Fair	Good	545	87					14	
	1	Good	Good	532	33	53				11	2
Creosotebush	1	Poor	Poor	189	3		50			47	
Mesquite	1	Fair	Good	312	42	14	1			42	
Mixed Desert Shrub	2	Poor	Fair	445	7	34	19	1		39	
Mixed Mountain Shrub	1	Fair	Good	657	50	13	2			35	
	1	Good	Good	826	46					51	4
Juniper	1	Good	Good	443	47	30	10			11	2
Weighted Average				583							
Swale Range Site -- G70X154N											
Mid-Grass	1	Poor	Fair	2,496	6	90	2			3	
	1	Fair	Good	404	51	4	20			4	11
Weighted Average				1,450							

Vegetation Subtype		Ecological Condition Class	Forage Value Class	Pounds Vegetation Production (per acre)	Percent Composition by Weight a/ Grasses D	Grasses I	Grasses L	Shrubs D	Shrubs I	Shrubs L	Forbs
CANADIAN-PECOS PLAINS MLRA 70-CP4 (continued)											
Gravelly Range Site -- G70X156N											
Creosotebush	1	Poor	Poor	321	2		13		81		3
Mixed Desert Shrub	1	Poor	Good	202	45		6		48		
Mixed Mountain Shrub	1	Fair	Good	298	47		23		29		
Weighted Average				274							
Shallow Loamy Range Site -- G70X159N											
Mid-Grass	1	Fair	Fair	684	23		18		58		1
Mixed Desert Shrub	2	Fair	Good	401	25	18	10		47		1
	1	Good	Good	80	59	9	19		10		4
Mixed Mountain Shrub	1	Poor	Fair	331	17		44		38		
	1	Fair	Good	102	41	31	7		15		6
	2	Good	Good	799	57	3	16		24		1
Pinyon-Juniper	1	Fair	Good	1,338	48	5	22		24		1
Juniper	1	Good	Good	377	91				2		7
Weighted Average				531							

Source: BLM Las Cruces District Inventory Data (Otero County), 1982.

Notes: a/D - Desirable
I - Intermediate
L - Least desirable species
Line totals do not always equal 100 because of rounding to whole numbers.
b/Number of transects included.
c/Weighted average derived from the sum of number of transects multiplied by pounds divided by the total number of transects.
d/Not a Soil Conservation Service range site; developed by BLM Las Cruces District for this document.

APPENDIX C-11

PUBLIC LAND ACRES AND PERCENT BY VEGETATION SUBTYPE AND RANGE SITE

MLRA-42, SOUTHERN DESERT

Vegetation Subtype	Range Site: D42X010NTX SD-2 (Gravelly)	D42X001NTX SD-3 (Gravelly)	D42X011NTX (Deep Sand)	D42X012NTX SO-2 (Sandy)	D42X004NTX SO-3 (Sandy)	D42X013NTX (Gyp Hills)	D42X014NTX SO-2 (Loamy)	D42X007NTX SO-3 (Loamy)	D42X018NTX SO-2 (Bottomland)	D42X017NTX SD-3 (Bottomland)	D42X021NTX SO-2 (Limestone Hills)	D42X020N SO-3 (Limestone Hills)	D42X027NTX (Igneous Hills and Mountains)	D42X036N (Salt Flats)	D42X002NTX (Shallow Sandy)	D42X006NTX (Gyp Upland)	D42X008NTX (Draw)	D42X025NTX (Shallow)	D42X030NTX (Limy)	Vegetation Subtype Subtotal	Percent[a/]
Short-Grass								409												409	.05
Mid-Grass		2,666		570			10,759	45,871	715	5,906		41,167	1,957	5,688	105,317	23,623	412	165	4,305	249,121	30.86
Creosotebush	9,692	73,799	1,187	7,454	684	10,952	3,764	56,449		486	603	1,614	127		110	22,694		47,561	962	238,138	29.50
Tarbush								3,531												3,531	.44
Mesquite			48,151	7,521			5,889									4,050			483	66,094	8.19
Fourwing Saltbush				8,443				3,064						580		9,552				21,639	2.68
Mixed Desert Shrub	2,489	1,797		1,401	5,459	3,647	1,214	30,825			11,850	139,607	12,438	1,830	4,197	912			1,093	218,759	27.10
Mixed Mountain Shrub						264							2,319							2,583	.32
Yucca					884															884	.11
Snakeweed															1,905					1,905	.24
Other Shrubs									105							3,853				3,958	.49
Pinyon-Juniper						186														186	.02
Juniper																					
MLRA-42 TOTAL	12,181	78,262	49,338	23,389	7,027	15,049	21,626	140,149	820	6,392	12,453	182,388	16,841	8,098	111,529	64,684	412	47,726	6,843	807,207	100.00
Percent of MLRA	1.51	9.70	6.11	3.15	.87	1.86	2.68	17.36	.10	.79	1.54	22.59	2.09	1.00	13.82	8.01	.05	5.91	.85		100.00
Percent of Total	1.28	8.20	5.17	2.66	.74	1.58	2.27	14.69	.09	.67	1.31	19.12	1.77	.85	11.69	6.78	.04	5.00	.72		84.61

MLRA-70, CANADIAN-PECOS PLAINS

Vegetation Subtype	Range Site: G70X151N Limestone Hills	G70X152N Shallow	G70X153N Loamy	G70X154N Swale	G70X156N Gravelly	G70X159N Shallow Loamy	D42X098NM Pseudoriparian	D42X099NM Badlands	Vegetation Subtype Subtotal	Percent[a/]	Vegetation Subtype Total[b/]	Percent
Short-Grass			991						991	.68	1,400	.15
Mid-Grass	7,031	1,155	167	1,172		223			73,032	49.75	322,153	33.77
Creosotebush			4,276		4,321			5,912	14,509	9.88	252,647	26.48
Tarbush											3,531	.37
Mesquite			866						866	.59	66,960	7.02
Fourwing Saltbush											21,639	2.27
Mixed Desert Shrub	2,382		967		1,682	3,966		7,797	16,794	11.44	235,553	24.69
Mixed Mountain Shrub	8,112	83	408		802	8,497			17,902	12.20	20,485	2.15
Yucca											884	.09
Snakeweed	1,953								1,953	1.33	3,858	.40
Other Shrubs							45		45	.03	4,003	.42
Pinyon-Juniper	19,398	120	118			91			19,727	13.44	19,913	2.09
Juniper			224			754			978	.67	978	.10
MLRA-70 TOTAL	102,160	1,358	8,017	1,172	6,805	13,531	45	13,709	146,797	100.01	954,004	100.00
Percent of MLRA	69.59	.93	5.46	.80	4.64	9.22	.03	9.34		100.01		
Percent of Total	10.71	.14	.84	.12	.71	1.42	.00	1.44		15.39		100.00

Source: BLM Las Cruces District Inventory Data, 1982-1983.

Notes: a/Percent totals may not add up to 100 percent due to rounding.
b/Indicates total of both Southern Desert and Canadian-Pecos Plains MLRAs.

APPENDIX C-12

FEDERAL ENDANGERED, PROPOSED, CANDIDATE, AND STATE SENSITIVE PLANTS

1. Common Name: Grayish white giant hyssop
   Scientific Name: Agastache cana
   Status: Special Concern
   Location: Sierra County

2. Common Name: Threadleaf false carrot
   Scientific Name: Aletes filifolius
   Status: Special Concern
   Location: Otero County

3. Common Name: Chicalote
   Scientific Name: Argemone pleiacantha
   Status: Federal Proposed
   Location: Otero County

4. Common Name: Castetter's milk-vetch
   Scientific Name: Astragalus castetteri
   Status: Federal Candidate
   Location: Sierra County

5. Common Name: New Mexico locoweed
   Scientific Name: Astragalus neomexicanus
   Status: Special Concern
   Location: Otero County

6. Common Name: None
   Scientific Name: Bothriochloa springfieldii
   Status: Special Concern
   Location: Otero County

7. Common Name: Organ Mountain paintbrush
   Scientific Name: Castilleja organorum
   Status: Special Concern
   Location: Sierra County

8. Common Name: Spoonleaf rabbitbrush
   Scientific Name: Chrysothamnus spathulatus ssp. elatior
   Status: Special Concern
   Location: Sierra County

9. Common Name: Plain thistle
   Scientific Name: Cirium inoratum
   Status: Special Concern
   Location: Otero County

10. Common Name: None
    Scientific Name: Corallorhiza wisteriana
    Status: Special Concern
    Location: Otero County

11. Common Name: Duncan corycactus
    Scientific Name: Coryphantha duncanii
    Status: Federal Candidate
    Location: Sierra County

12. Common Name: Scheer's pincushion cactus
    Scientific Name: Coryphantha scheeri
    Status: Special Concern
    Location: Sierra County

13. Common Name: Payson's hiddenflower
    Scientific Name: Cryptantha paysonii
    Status: Special Concern
    Location: Sierra County

14. Common Name: None
    Scientific Name: Dicranocarpus parviflora
    Status: Special Concern
    Location: Otero County

15. Common Name: Hedgehog cactus
    Scientific Name: Echinocereus spp.
    Status: Special Concern
    Location: Otero County

16. Common Name: Button cactus
    Scientific Name: Epithelantha micromeris
    Status: Special Concern
    Location: Sierra County

17. Common Name: None
    Scientific Name: Ferocactus hamatacanthus
    Status: Special Concern
    Location: Otero County

18. Common Name: Southwestern barrel cactus
    Scientific Name: Ferocactus wislizenii
    Status: Special Concern
    Location: Otero and Sierra Counties

19. Common Name: None
    Scientific Name: Hedeoma costatum
    Status: Special Concern
    Location: Otero County

20. Common Name: None
    Scientific Name: Helianthus laciniatus ssp. crenatus
    Status: Federal Candidate
    Location: Sierra County

21. Common Name: Globe berry
    Scientific Name: Ibervillea tenuisecta
    Status: Special Concern
    Location: Otero County

22. Common Name: Gypsum scalebroom
    Scientific Name: Lepidiospartum burgessii
    Status: Special Concern
    Location: Otero County

23. Common Name: None
    Scientific Name: Limonium limbatum
    Status: Special Concern
    Location: Otero County

24. Common Name: Wright's pincushion cactus
    Scientific Name: Mammillaria wrightii
    Status: Special Concern
    Location: Otero County

25. Common Name: None
    Scientific Name: Muhlenbergia villosa
    Status: Federal Candidate
    Location: Otero County

26. Common Name: Cliff nama
    Scientific Name: Nama xylopodum
    Status: Federal Candidate
    Location: Otero County

27. Common Name: Dagger-thorn cholla
    Scientific Name: Opuntia clavata
    Status: Special Concern
    Location: Otero County

28. Common Name: Grama grass cactus
    Scientific Name: Pediocactus papyracanthus
    Status: Federal Candidate
    Location: Sierra and Otero Counties

29. Common Name: Alamo penstemon
    Scientific Name: Penstemon alamosensis
    Status: Federal Proposed
    Location: Otero County

30. Common Name: Five flower rock daisy
    Scientific Name: Perityle quinqueflora
    Status: Special Concern
    Location: Otero County

31. Common Name: None
    Scientific Name: Perityle staurophylla
    Status: Special Concern
    Location: Otero County

32. Common Name: None
    Scientific Name: Phacelia intermedia
    Status: Special Concern
    Location: Sierra County

33. Common Name: None
    Scientific Name: Phacelia rupestris
    Status: Special Concern
    Location: Sierra County

34. Common Name: Mountain parsley
    Scientific Name: Pseudocymopterus longiradiatus
    Status: Special Concern
    Location: Otero County

35. Common Name: Moon pod
    Scientific Name: Selinocarpus lanceolatus
    Status: Special Concern
    Location: Otero County

36. Common Name: Guadalupe mountain mescal bean
    Scientific Name: Sophora gypsophila var. Guadalupensis
    Status: Federal Candidate
    Location: Otero County

37. Common Name: Threadleaf horsebrush
    Scientific Name: Tetradymia filifolia
    Status: Special Concern
    Location: Otero County

38. Common Name: None
    Scientific Name: Trichostema arizonicum
    Status: Special Concern
    Location: Sierra County

39. Common Name: Rain lily
    Scientific Name: Zephyranthes longiflora
    Status: Special Concern
    Location: Otero County

APPENDIX C-13

POISON PLANTS IDENTIFIED IN OTERO COUNTY AND PARTS OF EDDY, LINCOLN, AND CHAVES COUNTIES[a]

Plant Persistence[b]	Scientific Name	Common Name	Livestock Poisoned	Toxic Season
S	Agave lecheguilla	Lecheguilla	Cattle, Sheep, Goats	Winter, Spring, to All Year
AF	Amaranthus spp.	Pigweeds	Cattle, Horses, Sheep, Goats	All Year[c]
PF	Asclepias spp.	Milkweeds	Cattle, Sheep, Goats	Spring, Summer, to All Year
AF/PF	Astragalus spp.	Locoweeds	Cattle, Horses, Sheep, Goats	Spring, Summer, to All Year
S	Baccharis pteronioides	Yerba de Pasmo	Cattle, Sheep	Fall, Winter
AF/PF	Baileya multiradiata	Desert Baileya	Sheep, Goats	Spring, Summer, to All Year
S	Cercocarpus montanus	Mountain Mahogany	Cattle, Horses, Sheep, Goats	Summer, Fall
AF	Chenopodium album	Lambsquarter	Cattle, Horses, Sheep, Goats	All Year[c]
AF	Datura spp.	Thornapples	Cattle, Horses, Sheep	Spring, Summer, to All Year
PF	Delphinium spp.	Larkspurs	Cattle	Spring, Summer
AF	Descurainia pinnata	Tansy Mustard	Cattle, Sheep, Goats	Winter, Spring
AF	Drymaria pachyphylla	Inkweed	Cattle, Sheep, Goats	Fall, Summer, Spring, to All Year
AF/PF	Euphorbia spp.	Spurges	Cattle, Sheep	All Year
S	Flourensia cernua	Tarbush	Cattle, Sheep, Goats	Summer, Fall
HS	Gutierrezia spp.	Broom Snakeweed	Cattle, Sheep, Goats (causes abortion)	Winter, Spring
AF/BF/PF	Helenium spp.	Sneezeweeds	Cattle, Sheep	All Year
AF	Helianthus annus	Wild Sunflower	Cattle, Horses, Sheep, Goats	All Year[c]
AF/PF	Hymenoxys spp.	Bitterweeds Pingue	Cattle, Sheep	Winter, Spring, to All Year
T	Juniperus spp.	Junipers	Cattle (causes abortion)	Spring, Fall, to All Year
AF	Kallstroemia spp.	Caltrops	Cattle, Sheep, Goats	Spring, Summer
PF	Lupinus spp.	Lupines	Sheep	Summer
S	Nicotiana glauca	Tree Tobacco	Cattle, Horses, Sheep	All Year
S	Nolina spp.	Sacahuista Beargrass	Cattle, Goats	Spring
PF	Peganum harmula	African Rue	Cattle, Horses, Sheep	All Year
S	Phoradendron spp.	Mistletoe	Cattle	All Year
T	Pinus ponderosa	Ponderosa Pine	Cattle (causes abortion)	Spring, Fall, to All Year

APPENDIX C-13 (concluded)

POISON PLANTS IDENTIFIED IN OTERO COUNTY AND PARTS OF EDDY, LINCOLN, AND CHAVES COUNTIES[a]

Plant Persistence[b]	Scientific Name	Common Name	Livestock Poisoned	Toxic Season
S	Prosopis glandulosa	Mesquite	Cattle, Goats	Beans--Spring, Summer
PF	Psilostrophe tagetina	Woolly Paperflower	Cattle, Sheep	All Year
S	Quercus spp.	Oaks	Cattle, Sheep, Goats	Spring to All Year
PF	Rumex spp.	Spatterdocks	Cattle, Sheep, Goats	Spring, Fall
AF	Salsola spp.	Russian Thistle	Cattle, Horses, Sheep, Goats	All Year[c]
HS/PF	Senecio spp.	Groundsels	Cattle, Horses, Sheep, Goats	All Year
AF/PF	Solanum spp.	Nightshades	Cattle, Horses, Sheep, Goats	All Year
S/PF	Sophora spp.	Mescal Beans	Cattle, Sheep, Goats	All Year
PG	Sorghum spp.	Johnson Grass	Cattle, Horses, Sheep, Goats	Fall, Second Growth
AF	Tribulus terrestris	Goathead	Sheep	Spring, Summer
AF	Viguiera annua	Annual Goldeneye	Cattle	Fall
AF	Xanthium spp.	Cockleburs	Cattle, Horses, Sheep	Spring
PF	Zygadenus spp.	Death Camas	Cattle, Horses, Sheep	Spring, Summer

Sources: Kingsbury, 1964; Norris,and Valentine, 1954; Schickedanz, 1981.

Notes: a/For major plant species identified in Sierra County, see the Grazing Environmental Impact Statement, Southern Rio Grande Planning Area, 1981. Many of these plant species are important wildlife foods.

b/AF -- Annual Forb
PF -- Perennial Forb
BF -- Biannual Forb
HS -- Half Shrub
S -- Shrub
T -- Tree
PG -- Perennial Grass

c/These plants are only toxic under drought conditions.

APPENDIX D

LIVESTOCK GRAZING

APPENDIX D-1

PROPOSED MANAGEMENT CATEGORIES BY ALLOTMENT

Category I		Category M	Category C
7003	9018	7035	7015
7005	9020	7039	7017
7012	9021	7052	7019
7013	9022	7054	7020
7014	9023	7057	7028
*7022	9026	7069	7029
*7030	9029	7072	7049
7031	9030	7075	7063
7033	9031	7081	7070
*7034	9032	9004	
7037	9035	9007	
7044	9036	9015	
7050	9037	9019	
7051	9038	9024	
7055	9039	9025	
7056	9040	9027	
*7065	9042	9028	
*7066	9044	9033	
7067	9045	9041	
7068	9046	9043	
7074	9047	9048	
*7080	9049	9054	
9001	*9050	9057	
9002	9051	9060	
9003	9052	9061	
9005	9053	9065	
*9006	9055		
9008	9056		
9009	9058		
9010	9059		
9011	9062		
9012	9063		
9013	9064		
9014	9066		
9016	9067		
9017			

Source: BLM Las Cruces District Office Files, 1983.

Note: *Indicates allotments with Allotment Management Plans.

APPENDIX D-2

BUREAU OF LAND MANAGEMENT, NEW MEXICO
RANGELAND CONSULTATION, COOPERATION, AND COORDINATION POLICY
SECTION 8 PUBLIC RANGELANDS IMPROVEMENT ACT (PL-95-514)

PURPOSE

Section 8 of Public Law (PL)-95-514 specifically requires consultation, cooperation, and coordination with lessees, permittees, and landowners, the District Grazing Advisory Boards, and State agencies involved in the development, revision, or evaluation of allotment management plans (hereinafter referred to as Cooperative Management Plans [CMPs]). It is the intent of the Bureau of Land Management, New Mexico, to expand the concept of consultation, cooperation, and coordination (hereinafter referred to as consultation) into all phases of the grazing program which includes programs and policies and the execution of such programs and policies which affect grazing.

INTRODUCTION

The procedures apply specifically to the target group (see Attachment 1, Target Group Representatives), but also may apply to other affected interests. These procedures consist of seven phases and are intended to ensure compliance with Section 8 of PL-95-514. These phases are:

I. Preplanning and Allotment Categorization

II. Inventory and Inventory-Related Studies

III. Resource Management Plan (RMP), Management Framework Plan (MFP) Amendment (Grazing), and Environmental Impact Statement (EIS) Development

IV. Rangeland Program Summary and Updates

V. Livestock Adjustments, Grazing Programs, Cooperative Management Plans, Revisions, or Evaluations

VI. Rangeland Monitoring

VII. Documentation

PHASE I -- PREPLANNING

A. The District Manager or Area Manager will notify grazing permittees by letter concerning the consultation process and listing membership of the target group.

B. The District Manager or his representative will contact the target group at the beginning of the preplanning analysis to request their input into the identification of issues.

C. In coordination with the target group, the District will initiate allotment analysis and will develop standard and site-specific criteria for allotment categories M (maintain), I (improve), and C (custodial) and will make initial categorization of each allotment. Review and comment will be requested of the target group in the development of category criteria and again after the initial categorization of allotments.

D. The District Manager or his representative shall meet with the target group and on a one-to-one basis with each owner-operator, then with groups of owner-operators to ensure that their ideas and concerns are considered.

E. Following Steps A, B, and C, all affected parties will be provided a summary of issues for their review and comment before finalization. A final revision will be mailed to each party.

PHASE II -- INVENTORY AND INVENTORY-RELATED STUDIES

A. The District Manager or his representative will notify the target group of the inventories and inventory-related studies to be conducted, including the proposed timeframe for conducting the inventories or studies.

B. Prior to the initiation of each inventory or inventory-related study, the target group will be notified of the inventories and inventory-related studies and their participation will be requested.

C. All inventory or study teams shall coordinate a date and time with the permittee and shall stop at the ranch headquarters on the first day of the inventory or study on an allotment. If the permittee is absent, a note will be left indicating the work being done and the locations of each crew.

PHASE III -- RESOURCE MANAGEMENT PLAN, MANAGEMENT FRAMEWORK PLAN (MFP) AMENDMENT (GRAZING), AND ENVIRONMENTAL IMPACT STATEMENT (EIS) DEVELOPMENT

A. Consultation with the target group, along with interested publics, is required under the Land Use Planning Process (see 43 Code of Federal Regulations [CFR] 1610.3) and will be carried out as stated in 43 CFR 1610.2, Public Participation.

B. The District Manager or his representative shall contact the Target Group to request their involvement during the allotment analysis process (I.B and II.C). The results of the various inventories and studies, i.e., forage availability, rangeland condition, forage production, prior weather effects, utilization, wildlife habitat needs, socioeconomic needs, watershed needs, final allotment categorization, etc., will be discussed with these participants during this contact. The Allotment Analysis Review will include discussion on the need for CMP versus no CMP, design of the grazing program, locating rangeland improvements, and land treatment potential, etc.

PHASE IV -- RANGELAND PROGRAM SUMMARY AND UPDATES

A Rangeland Program Summary (RPS) will be targeted for release within 5 months following release of the Final Environmental Impact Statement (FEIS). The District Manager or his representative shall make contact with the target group within 3 months to review the draft RPS. (See Attachment 2 for the outline of a typical RPS.) The thrust of this phase will be to seek mutual agreement on the RPS. In the event of disagreements, further consultation may be necessary with the District Advisory Council. It is essential that this phase be conducted in an atmosphere of mutual trust since all subsequent range-related actions will hinge on this document. After completion, periodic (annual) updates of the RPS's will be issued.

PHASE V -- LIVESTOCK ADJUSTMENTS, GRAZING PROGRAMS, COOPERATIVE MANAGEMENT PLANS, REVISIONS, OR EVALUATIONS

A. Permittees may request the participation of the target group with BLM in the development, revision, or evaluation of a CMP or other livestock management consideration. (See Attachment 3 for a sample notice to permittees regarding livestock adjustments.)

B. Individual permittees and the State Land Commissioner, where State land is involved, will be contacted prior to consultations concerning the adjustment of grazing use. It is not the intent of BLM to contact all members of the target group prior to the actions discussed in this phase, but rather to request their assistance in the resolution of differences between permittees and BLM.

C. A copy of all proposed decisions involving State land will be provided to the State Land Commissioner and any of the target group who has expressed an interest in a particular allotment or geographic area. In those situations where BLM has issued proposed decisions and protests have been filed, and the allotment includes State land, the State Land Office and any of the target group who has expressed an interest in a particular allotment or geographic area will be advised and will be invited to participate fully in all meetings and/or actions pertinent to the proposed decision and subsequent protest.

D. In the course of consultation between the target group and BLM regarding initial stocking rates following a Grazing EIS, if an agreed upon stocking rate cannot be reached, and after the issuance of a proposed decision and the filing of a protest by the permittee, the target group will be asked to again review the allotment to assist in arriving at an acceptable stocking rate.

PHASE VI -- RANGELAND MONITORING

The target group will be convened to inform them of the intent and procedure to be used in establishing monitoring studies and their participation will be requested. The contact procedure identified in II.B and C will also be used to inform permittees of study establishment methods, schedules, analysis, and evaluations. (See Attachment 3 for a sample notice to grazing permittees regarding monitoring studies.).

PHASE VII -- DOCUMENTATION

A. Documentation of all contacts, whether by mail, in person, by telephone, etc., is mandatory. Documentation shall be kept in chronological order and properly filed by allotment if allotment-specific or in a general file if not allotment-specific.

B. During inventories or studies, the Area Manager will document pertinent information such as who worked where, hours spent on quality control with each team, contact with the public, contact with the permittee or unauthorized representative, etc.

C. All documentation is available at the District or Area Offices for review. Summaries of study data will be made available upon request. Detailed inventory or study data will be available for review in District or Resource Area Offices.

D. Prior to the preplanning phase, the District Manager shall contact the target group and ask them if they wish to be notified of actions by certified mail rather than regular mail. Parties that do not respond will receive all correspondence by regular mail.

ATTACHMENT 1

TARGET GROUP REPRESENTATIVES

1. Grazing Lessees or Permittees

2. State Land Commissioner
   P. O. Box 1148
   Santa Fe, New Mexico 87503

3. New Mexico Department of Agriculture
   Division of Agricultural Programs and Resources
   P. O. Box 5702
   Las Cruces, New Mexico 88003

4. Range Improvement Task Force
   New Mexico State University
   Box 3 AE
   Las Cruces, New Mexico 88003

5. All members of local grazing advisory boards

6. All other landowners within each specific allotment

*7. Federal land managing agencies affected by or affecting grazing management on BLM allotments

* The target group for each allotment will not, in most cases, consist of all the target group representatives listed in Attachment 1. If, for example, there is no State land in an allotment, it is not necessary to contact the State Land Commissioner.

ATTACHMENT 2

OUTLINE FOR RANGELAND PROGRAM SUMMARY

I. INTRODUCTION

Describe the context for the decision including the legal background for the grazing EIS's, a history of grazing in the EIS area, and the existing situation.

II. THE PROGRAM

The Rangeland Program Summary shall summarize the land use planning objectives for all rangeland uses and shall set forth those decisions that affect livestock grazing, including for each allotment the proposed rangeland improvements and the environmental costs and benefits of the program.

The document shall also contain a proposed schedule for the issuance of decisions and describe the procedures and time available for all affected interests to express their views or take action on decisions.

The document will describe the supplemental inventories and studies necessary to reach site-specific decisions in the Improve (I) Category where existing information is inadequate or lacking.

III. PUBLIC INVOLVEMENT

Describe the involvement from groups, individuals, and government agencies at all levels during land use planning, preparation of the EIS, and the decision process.

IV. ACTION PLAN

A. Administrative Actions. Describe the administrative process, including the steps and schedule for implementing the decision, i.e., grazing permits.

B. Rangeland Improvements. Describe the number, type, and schedule for rangeland improvement projects.

C. Related Actions. Describe the number, type, and schedule for actions such as wildlife habitat developments, watershed improvements, etc., that are related to the grazing decision and will be taken concurrently with it. This is an expansion of material described in II.A.

D. Grazing Use Adjustments. Describe the increases, decreases, and unchanged situations. Clearly state the schedule for adjustments and, where data are adequate, describe any actions that will be taken to reduce the economic impact on ranchers scheduled for reductions.

E. Appropriations. Development of rangeland improvement facilities and grazing management programs will be based on current appropriations.

F. Monitoring. Describe the specific evaluation studies and research actions that will be taken to monitor resource conditions resulting from the program decisions.

SUMMARY UPDATES

I. INITIAL DOCUMENT

This document summarizes actions proposed to achieve the land use objectives and to implement the land use planning decisions and describes the monitoring program for the area.

II. SUBSEQUENT UPDATES

This document shall summarize, by allotment, the progress toward achieving planning objectives, the numbers of decisions issued, number of decisions to be issued, and progress in the monitoring and rangeland improvement programs. Identify any deviations from the grazing program, as set forth in the summary document, and reasons for the deviation.

IN REPLY REFER TO:

Appendix II

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
LAS CRUCES DISTRICT OFFICE
P.O. Box 1420
Las Cruces, New Mexico 88001

DISTRICT OFFICE

NOTICE TO BLM GRAZING PERMITTEES

The New Mexico Bureau of Land Management Rangeland Consultation Policy is designed to compliment the Congressional intent set forth in Public Law 95-514. This policy requires consultation, cooperation, and coordination with an identified target group composed of lessees, permittees, and landowners, the District Grazing Advisory Board, and State agencies. This includes the planning, development, and evaluation of the grazing programs on public land administered by the Bureau of Land Management.

A Range Conservationist from the _____ District has been or will be initiating monitoring studies and talking with you with regard to future livestock grazing use. Any adjustments will be in accordance with the decisions that were reached after considering the alternatives described in the _____ Environmental Impact Statement and outlined in the _____ Rangeland Program Summary.

If you wish, you may have someone from the target group present during the consultation meetings. The New Mexico Department of Agriculture has been designated to represent the Governor's Office and is available at your request to participate in the process. Depending on their workload at the time, other agencies may also be available. Please feel free to contact any of the individuals or agencies listed below. If needed, they will make an effort to be in attendance at future meetings.

Mr. Ronald J. White, Director
Department of Agriculture
Division of Agricultural Programs
and Resources
Box 5702
Las Cruces, New Mexico 88003
Telephone: (505) 646-2642

Commissioner of Public Lands
State of New Mexico
Attn: Mr. Dwain Glidewell
Box 1148
Santa Fe, New Mexico 87503
Telephone: (505) 827-5731

Range Improvement Task Force
Cooperative Extension Service
Attn: Dr. Jerry Schickedanz
Box 3 AE, New Mexico State University
Las Cruces, New Mexico 88003
Telephone: (505) 646-2218

Mr. Ed Baca
New Mexico State Land Office
Las Cruces Representative
Telephone: (505) 523-7021

*List appropriate grazing advisory board members
*List any other appropriate agency or affected interests
*These listings are prepared and contacted by the District Office

If you have any questions, please contact the Area Manager at _____ or the District Manager at _____, or write to P. O. Box _____, _____, New Mexico.

District or Area Manager

APPENDIX D-3

CRITERIA USED FOR CATEGORIZING I, M, AND C ALLOTMENTS

The following criteria pertain to the three identified categories, although allotments within each category will not have to meet all the criteria to be managed according to the category objectives.

CATEGORY I (IMPROVE CATEGORY) CRITERIA

- -- Present rangeland condition is unsatisfactory.
- -- Allotments have moderate to high resource production potential and are producing at low to moderate levels.
- -- Serious resource-use conflicts/controversy exist.
- -- Opportunities exist for positive economic return from public investments.
- -- Present management appears unsatisfactory.
- -- Other criteria appropriate to Otero County apply. (See Attachment 1.)

CATEGORY M (MAINTAIN CATEGORY) CRITERIA

- -- Present rangeland condition is satisfactory.
- -- Allotments have moderate or high resource production potential and are producing near their potential (or the trend is moving in that direction).
- -- No serious resource-use conflicts/controversy exist.
- -- Opportunities may exist for positive economic return from public investments.
- -- Present management appears satisfactory.
- -- Other criteria appropriate to Otero County apply. (See Attachment 1.)

CATEGORY C (CUSTODIAL CATEGORY) CRITERIA

- -- Present rangeland condition is not a factor.
- -- Allotments have low resource production potential and are producing near their potential.
- -- Limited resource-use conflicts/controversy may exist.
- -- Opportunities for positive economic return on public investments do not exist or are constrained by technological or economic factors.
- -- Present management appears satisfactory or is the only logical practice under existing resource conditions.
- -- Other criteria appropriate to Otero County apply. (See Attachment 1.)

Source: BLM Final Grazing Management Policy, 1982.

ATTACHMENT 1

Allotment Name and No. _____
Prepared by _____
Date _____

DICHOTOMOUS KEY USED IN SELECTING MANAGEMENT STRATEGIES
FOR GRAZING ALLOTMENTS IN THE LAS CRUCES DISTRICT

	GO TO
I. Type Grazing Authorization for Allotment	
A. Section 15 leases and those 100% Section 3 billings where a very small percent of the allotment is Federal Range	
1. Is there a known resource conflict on all or part of the Federal lands being caused by the present grazing use?	
a. No	Category "M" Allotment
b. Yes--(Name the resource and attach a map or give legal description of affected Federal lands)	Category "I" lands (affected parcels only)
B. Section 3 billing including those where 100% of the land is Federal range	II
II. Present Management Indicates That:	
A. Weighted average ecological condition value is 36 or higher:	
1. Weighted average utilization class is moderate or less	
a. No resource conflicts caused by livestock grazing are known	Category "M"
b. It appears a resource conflict may exist between grazing and _____	Category "I"
2. Weighted average utilization class is heavy or higher	Category "I"
B. Weighted average ecological condition value is between 11 and 36:	
1. Weighted average utilization class is moderate or less:	
a. No resource conflicts caused by livestock grazing are known	III
b. No resource conflicts caused by livestock grazing exist and there is no reason to increase herbage production on the allotment	Category "M"
c. It appears a resource conflict may exist between grazing and _____	Category "I"
2. Weighted average utilization class is heavy or higher	Category "I"

C. Weighted average ecological condition value is less than 10:

1. Weighted average utilization class is moderate or less:

a. No resource conflicts caused by livestock grazing are known — III

b. It appears a resource conflict may exist between grazing and _____ — Category "I"

2. Weighted average utilization class is heavy or higher — III

3. Utilization class cannot be determined because of lack of forage species to evaluate and no known resource conflicts caused by grazing exist — Category "C"

III. Economic Consideration

A. Considering the entire allotment:

1. The benefit/cost would probably exceed a 1:1 ratio for the entire allotment — Category "I" Allotment

2. The benefit/cost would probably be less than a 1:1 ratio for the entire allotment

a. A change in grazing authorization should be considered — Category "I" Allotment

b. A change in grazing authorization would have very little, if any, affect — Category "C" Allotment

B. Considering a partial allotment only:

1. Individual project(s) would probably exceed a 1:1 ratio

a. Appropriated funds (4322 or 8100) would be requested to initiate the range improvements — Category "I" Allotment

b. Private or range betterment funds (8100) will finance proposed cost effective jobs — Category "M" Allotment

2. Individual project(s) would probably not exceed a 1:1 ratio — Category "M" or "C" Allotment

The Key is a guide to maintain some degree of consistency; however, judgment should be used to prevent erroneous classification, so the Key can be overridden at any time when sufficient rationale are included in the narrative section.

NARRATIVE JUSTIFICATION OF CATEGORY PLACEMENT: This allotment is in the _____ category (if applicable), except for the following areas which are an "I" category.

Federal Acreage: _____ Description of Area: _____

(add additional sheets as necessary)

APPENDIX D-4

CATEGORIZATION AND PRESENT ACRES
IN EACH ECOLOGICAL CONDITION CLASS BY ALLOTMENT[a]

Allotment Number	Public Land Acres	Ecological Condition Class (acres)[b] Good	Fair	Poor	Unclassified Acres[c]
		Category I			
7003	2,368		265	2,103	
7005	934		203	731	
7012	2,509			2,509	
7013	5,237		4,355	882	
7014	7,347			7,347	
*7022	5,234		3,307	1,927	
*7030	5,540			5,540	
7031	4,334			4,334	
7033	844		585	259	
*7034	25,503		1,155	24,348	
7037	40,724	4,136		36,588	
7044	49		49		
7050	24,232	3,874	2,820	17,538	
7051	16,795		1,147	15,648	
7055	9,743			9,743	
7056	1,208			1,208	
*7065	7,286		2,908	4,378	
*7066	2,819		1,478	1,341	
7067	6,259		673	5,586	
7068	5,403		1,830	3,573	
*7080	19,272	1,957	2,334	14,981	
9001	10,576	887	9,405	284	
9002	6,500		3,520	2,980	
9003	22,042	1,102	20,753	187	
9005	2,343	325	2,018		
*9006	42,265	16,779	19,448	6,038	
9008	2,125		1,953	172	
9009	4,561	3,231		1,330	
9010	43,175	11,813	25,102	6,260	
9011	6,975		2,382	4,593	
9012	4,807		550	4,257	
9013	14,512		8,342	6,170	
9014	7,210	3,562	2,066	1,582	
9016	7,218	573	6,645		
9018	55,827	14,686	40,327	814	
9020	17,925	27	558	17,340	
9021	10,227		8,756	1,471	
9023	1,594	584	1,010		
9026	9,384	686	7,818	880	
9029	3,460	479	1,677	1,304	

CATEGORIZATION AND PRESENT ACRES
IN EACH ECOLOGICAL CONDITION CLASS BY ALLOTMENT[a]

Allotment Number	Public Land Acres	Ecological Condition Class (acres)[b] Good	Fair	Poor	Unclassified Acres[c]
		Category I (continued)			
9030	10,448		5,853	4,595	
9031	43,386	9,122	33,531	733	
9032	5,783		997	4,786	
9035	30,352		5,662	24,690	
9036	32,705		23,722	8,983	
9037	10,863	5,792	5,071		
9038	7,367		290	7,077	
9039	16,158		9	16,149	
9040	12,011		3,839	8,172	
9042	7,133		1,579	5,554	
9044	3,674		1,394	2,280	
9045	2,213		2,213		
9046	19,699	12,493	2,454	4,752	
9047	9,537	6,491		3,046	
9049	17,635	7,101	4,119	6,415	
*9050	19,759	13,477	2,465	3,817	
9051	24,995	91	20,043	4,861	
9052	1,608	575	1,033		
9053	37,939		29,662	8,277	
9055	5,770	974	2,866	1,930	
9056	7,355	3,308	1,318	2,729	
9058	6,118	3,173	940	2,005	
9059	2,476	458	2,018		
9062	9,573			9,573	
9063	16,598	675	3,732	12,191	
9064	37,693	3,854	33,622	217	
9067	4,709		381	4,328	
		Category M			
7039	19,073		977	18,096	
7057	249			249	
7069	406		21	385	
7081	425			425	
7035	35				35
7052	773				773
7054	592				592
7072	771				771
7074	59				59
7075	81				81
9004	3,107		340	2,767	
9017	240	220	20		
9022	382				382

CATEGORIZATION AND PRESENT ACRES
IN EACH ECOLOGICAL CONDITION CLASS BY ALLOTMENT[a]

Allotment Number	Public Land Acres	Ecological Condition Class (acres)[b] Good	Fair	Poor	Unclassified Acres[c]
		Category M (continued)			
9025	1,773	157	1,006	610	
9027	6,658	1,118	4,576	964	
9028	6,073	4,082	1,062	929	
9033	19,438	354	749	18,335	
9048	6,115		2,501	3,614	
9007	716				716
9015	79				79
9019	80				80
9024	662				662
9041	733				733
9043	1,448				1,448
9054	82				82
9057	240				240
9060	1,052				1,052
9061	363				363
9065	108				108
9066	155				155
		Category C			
7015	681				681
7017	837				837
7019	437				437
7020	118				118
7028	975				975
7029	2,235				2,235
7049	826				826
7063	1,589				1,589
7070	78				78

Source: BLM Las Cruces District Office Files, 1984.

Notes: *Indicates allotments with Allotment Management Plans.
a/Acres used were calculated through the digitizing system and will not match case file acres. (See Appendix C-4 for methodology on digitizing.)
b/There are no acres in the excellent ecological condition class.
c/Section 15 allotments.

APPENDIX D-5

PROPOSED RANGELAND DEVELOPMENTS[a]
BALANCED ALTERNATIVE

Allotment Number	Development[b]	Quantity and Unit	Average Acres Disturbed Per Unit Short-Term	Per Unit Long-Term	Total Short-Term	Total Long-Term	Average Cost Per Unit	Total Cost
7005	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	$ 8,000	$ 8,000
	Fence	1 mi.	1.00	.20	1.00	.20	2,400	2,400
7012	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
7014	Fence	1 1/2 mi.	1.00	.20	1.50	.30	2,400	3,600
7031	Water Catchment	1	.03	.03	.03	.03	25,000	25,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
7033	Fence	1 mi.	1.00	.20	1.00	.20	2,400	2,400
	Pipeline	1/4 mi.	1.50	.10	.38	.03	5,000	1,250
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
7037	Fence	2 1/4 mi.	1.00	.20	2.25	.45	2,400	5,400
7050	Pipeline	4 mi.	1.50	.10	6.00	.40	5,000	20,000
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
	Well with Pump or Windmill	2	.50	.10	1.00	.20	26,000	52,000
7051	Pipeline	6 mi.	1.50	.10	9.00	.60	5,000	30,000
	Fence	4 mi.	1.00	.20	4.00	.80	2,400	9,600
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
	Storage Tank (20,000 gals.)	3	.30	.05	.90	.15	9,500	28,500
7055	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
7056	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
9002	Fence	2 3/4 mi.	1.00	.20	2.75	.55	2,400	6,600
	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
9008	Pipeline	1/4 mi.	1.50	.10	.38	.03	5,000	1,250
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
9009	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000

APPENDIX D-5 (continued)

PROPOSED RANGELAND DEVELOPMENTS[a]
BALANCED ALTERNATIVE

Allotment Number	Development[b]	Quantity and Unit	Average Acres Disturbed Per Unit Short-Term	Per Unit Long-Term	Total Short-Term	Total Long-Term	Average Cost Per Unit	Total Cost
9010	Fence	4 1/4 mi.	1.00	.20	4.25	.85	$ 2,400	$10,200
	Pipeline	1 1/2 mi.	1.50	.10	2.25	.15	5,000	7,500
9012	Fence	1 mi.	1.00	.20	1.00	.20	2,400	2,400
9013	Pipeline	1 1/4 mi.	1.50	.10	1.88	.13	5,000	6,250
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
9031	Fence	4 mi.	1.00	.20	4.00	.80	2,400	9,600
	Pipeline	5 3/4 mi.	1.50	.10	8.63	.58	5,000	28,750
	Well with Pump or Windmill	2	.50	.10	1.00	.20	26,000	52,000
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
	Storage Tank (20,000 gals.)	3	.30	.05	.90	.15	9,500	28,500
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
9035	Pipeline	2 1/2 mi.	1.50	.10	3.75	.25	5,000	12,500
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
9036	Pipeline	1 1/2 mi.	1.50	.10	2.25	.15	5,000	7,500
	Fence	1 3/4 mi.	1.00	.20	1.75	.35	2,400	4,200
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9037	Pipeline	1 1/4 mi.	1.50	.10	1.88	.13	5,000	6,250
	Drinking Trough	1	.10	.08	.10	.08	750	750
9038	Pipeline	1 3/4 mi.	1.50	.10	2.63	.18	5,000	8,750
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
9039	Pipeline	2 1/4 mi.	1.50	.10	3.38	.23	5,000	11,250
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
9040	Fence	7 1/4 mi.	1.00	.20	7.25	1.45	2,400	17,400
	Pipeline	1 1/4 mi.	1.50	.10	1.88	.13	5,000	6,250
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
9042	Fence	4 mi.	1.00	.20	4.00	.80	2,400	9,600
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000

APPENDIX D-5 (continued)

PROPOSED RANGELAND DEVELOPMENTS[a]
BALANCED ALTERNATIVE

Allotment Number	Development[b]	Quantity and Unit	Average Acres Disturbed Per Unit Short-Term	Per Unit Long-Term	Total Short-Term	Total Long-Term	Average Cost Per Unit	Total Cost
9044	Fence	1 1/2 mi.	1.00	.20	1.50	.30	$ 2,400	$ 3,600
	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9046	Pipeline	2 1/4 mi.	1.50	.10	3.38	.23	5,000	11,250
9047	Fence	2 1/2 mi.	1.00	.20	2.50	.50	2,400	6,000
	Pipeline	3/4 mi.	1.50	.10	1.13	.08	5,000	3,750
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9049	Pipeline	1 3/4 mi.	1.50	.10	2.63	.18	5,000	8,750
	Fence	3/4 mi.	1.00	.20	.75	.15	2,400	1,800
	Drinking Trough	1	.10	.08	.10	.08	750	750
9050*	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9051	Fence	3/4 mi.	1.00	.20	.75	.15	2,400	1,800
	Pipeline	4 1/4 mi.	1.50	.10	6.38	.43	5,000	21,250
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
9052	Pipeline	3/4 mi.	1.50	.10	1.13	.08	5,000	3,750
	Drinking Trough	1	.10	.08	.10	.08	750	750
9053	Fence	5 mi.	1.00	.20	5.00	1.00	2,400	12,000
	Pipeline	8 1/2 mi.	1.50	.10	12.75	.85	5,000	42,500
	Well with Pump or Windmill	2	.30	.10	1.00	.20	26,000	52,000
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
9055	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
9056	Fence	2 3/4 mi.	1.00	.20	2.75	.55	2,400	6,600
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
9059	Fence	2 1/2 mi.	1.00	.20	2.50	.50	2,400	6,000
9062	Fence	4 1/2 mi.	1.00	.20	4.50	.90	2,400	10,800
9063	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
	Fence	5 mi.	1.00	.20	5.00	1.00	2,400	12,000
	Pipeline	4 mi.	1.50	.10	6.00	.40	5,000	20,000
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500

APPENDIX D-5 (concluded)

PROPOSED RANGELAND DEVELOPMENTS[a/]
BALANCED ALTERNATIVE

Summary

Pipeline	56 3/4 miles
Fence	60 miles
Well with Pump or Windmill	14
Storage Tank	12
Drinking Trough	37
Earthen Stock Tank	9
Water Catchment	1

Short-Term Total = 193.72 acres disturbed
Long-Term Total = 39.93 acres disturbed
Total Cost = $1,030,500

Source: BLM Las Cruces District Office Files, 1983.

Notes: *Indicates allotments with Allotment Management Plans. .
a/Rangeland developments are proposed for livestock, but wildlife would benefit.
b/Depth of wells and size of storage tanks will vary. The costs were an estimated average.

APPENDIX D-6

PROPOSED RANGELAND DEVELOPMENTS[a]
PRODUCTION ALTERNATIVE

Allotment Number	Development[b]	Quantity and Unit	Average Acres Disturbed Per Unit Short-Term	Per Unit Long-Term	Total Short-Term	Total Long-Term	Average Cost Per Unit	Total Cost
7005	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	$ 8,000	$ 8,000
	Fence	1 mi.	1.00	.20	1.00	.20	2,400	2,400
7012	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
7014	Fence	1 1/2 mi.	1.00	.20	1.50	.30	2,400	3,600
7031	Water Catchment	1	.03	.03	.03	.03	25,000	25,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
7033	Fence	1 mi.	1.00	.20	1.00	.20	2,400	2,400
	Pipeline	1/4 mi.	1.50	.10	.38	.03	5,000	1,250
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
7037	Fence	2 1/2 mi.	1.00	.20	2.50	.50	2,400	6,000
7039	Fence	5 1/2 mi.	1.00	.20	5.50	1.10	2,400	13,200
7050	Pipeline	4 mi.	1.50	.10	6.00	.40	5,000	20,000
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
	Well with Pump or Windmill	2	.50	.10	1.00	.20	26,000	52,000
7051	Pipeline	6 mi.	1.50	.10	9.00	.60	5,000	30,000
	Fence	4 mi.	1.00	.20	4.00	.80	2,400	9,600
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
	Storage Tank (20,000 gals.)	3	.30	.05	.90	.15	9,500	28,500
7055	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
7056	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
7069	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
7081	Fence	1 mi.	1.00	.20	1.00	.20	2,400	2,400
9002	Fence	2 3/4 mi.	1.00	.20	2.75	.55	2,400	6,600
	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000

APPENDIX D-6 (continued)

PROPOSED RANGELAND DEVELOPMENTS[a]
PRODUCTION ALTERNATIVE

Allotment Number	Development[b]	Quantity and Unit	Average Acres Disturbed: Per Unit, Short-Term	Per Unit, Long-Term	Total, Short-Term	Total, Long-Term	Average Cost Per Unit	Total Cost
9004	Pipeline	1/2 mi.	1.50	.10	.75	.05	$ 5,000	$ 2,500
9008	Pipeline	1/4 mi.	1.50	.10	.38	.03	5,000	1,250
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
9009	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
9010	Fence	4 1/4 mi.	1.00	.20	4.25	.85	2,400	10,200
	Pipeline	1 1/2 mi.	1.50	.10	2.25	.15	5,000	7,500
9012	Fence	1 mi.	1.00	.20	1.00	.20	2,400	2,400
9013	Pipeline	1 1/4 mi.	1.50	.10	1.88	.13	5,000	6,250
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
9031	Fence	4 mi.	1.00	.20	4.00	.80	2,400	9,600
	Pipeline	5 3/4 mi.	1.50	.10	8.63	.58	5,000	28,750
	Well with Pump or Windmill	2	.50	.10	1.00	.20	26,000	52,000
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
	Storage Tank (20,000 gals.)	3	.30	.05	.90	.15	9,500	28,500
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
9033	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
	Pipeline	6 mi.	1.50	.10	9.00	.60	5,000	30,000
9035	Pipeline	2 1/2 mi.	1.50	.10	3.75	.25	5,000	12,500
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
9036	Pipeline	1 1/2 mi.	1.50	.10	2.25	.15	5,000	7,500
	Fence	1 3/4 mi.	1.00	.20	1.75	.35	2,400	4,200
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9037	Pipeline	1 1/4 mi.	1.50	.10	1.88	.13	5,000	6,250
	Drinking Trough	1	.10	.08	.10	.08	750	750
9038	Pipeline	1 3/4 mi.	1.50	.10	2.63	.18	5,000	8,750
	Drinking Trough	2	.10	.08	.20	.16	750	1,500

APPENDIX D-6 (continued)

PROPOSED RANGELAND DEVELOPMENTS[a]
PRODUCTION ALTERNATIVE

Allotment Number	Development[b]	Quantity and Unit	Average Acres Disturbed Per Unit Short-Term	Per Unit Long-Term	Total Short-Term	Total Long-Term	Average Cost Per Unit	Total Cost
9039	Pipeline	2 1/4 mi.	1.50	.10	3.38	.23	$ 5,000	$11,250
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
9040	Fence	7 3/4 mi.	1.00	.20	7.75	1.55	2,400	18,600
	Pipeline	1 1/4 mi.	1.50	.10	1.88	.13	5,000	6,250
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
9042	Fence	4 mi.	1.00	.20	4.00	.80	2,400	9,600
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
9044	Fence	1 1/2 mi.	1.00	.20	1.50	.30	2,400	3,600
	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9046	Pipeline	2 1/4 mi.	1.50	.10	3.38	.23	5,000	11,250
9047	Fence	2 1/2 mi.	1.00	.20	2.50	.50	2,400	6,000
	Pipeline	3/4 mi.	1.50	.10	1.13	.08	5,000	3,750
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9048	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
9049	Pipeline	1 3/4 mi.	1.50	.10	2.63	.18	5,000	8,750
	Fence	3/4 mi.	1.00	.20	.75	.15	2,400	1,800
	Drinking Trough	1	.10	.08	.10	.08	750	750
9050*	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9051	Fence	3/4 mi.	1.00	.20	.75	.15	2,400	1,800
	Pipeline	4 1/4 mi.	1.50	.10	6.38	.43	5,000	21,250
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
9052	Pipeline	3/4 mi.	1.50	.10	1.13	.08	5,000	3,750
	Drinking Trough	1	.10	.08	.10	.08	750	750
9053	Fence	5 1/2 mi.	1.00	.20	5.50	1.10	2,400	13,200
	Pipeline	8 1/2 mi.	1.50	.10	12.75	.85	5,000	42,500
	Well with Pump or Windmill	2	.50	.10	1.00	.20	26,000	52,000
	Drinking Trough	3	.10	.08	.30	.24	750	2,250

APPENDIX D-6 (concluded)

PROPOSED RANGELAND DEVELOPMENTS[a]
PRODUCTION ALTERNATIVE

Allotment Number	Development[b]	Quantity and Unit	Average Acres Disturbed Per Unit Short-Term	Per Unit Long-Term	Total Short-Term	Total Long-Term	Average Cost Per Unit	Total Cost
9055	Pipeline	1 mi.	1.50	.10	1.50	.10	$ 5,000	$ 5,000
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
9056	Fence	2 3/4 mi.	1.00	.20	2.75	.55	2,400	6,600
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
9059	Fence	2 1/2 mi.	1.00	.20	2.50	.50	2,400	6,000
9062	Fence	4 1/2 mi.	1.00	.20	4.50	.90	2,400	10,800
9063	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
	Fence	5 mi.	1.00	.20	5.00	1.00	2,400	12,000
	Pipeline	4 mi.	1.50	.10	6.00	.40	5,000	20,000
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500

Summary

Pipeline	65 1/4 miles
Fence	67 3/4 miles
Well with Pump or Windmill	15
Storage Tank	13
Drinking Trough	38
Earthen Stock Tank	9
Water Catchment	1

Short-Term Total = 215.22 acres disturbed
Long-Term Total = 42.46 acres disturbed
Total Cost = $1,127,850

Source: BLM Las Cruces District Office Files, 1983.

Notes: *Indicates allotments with Allotment Management Plans.
a/Proposed rangeland developments under the Balanced and Protection Alternatives are also included in this table. Rangeland developments are proposed for livestock, but wildlife would benefit.
b/Depth of wells and size of storage tanks will vary. The costs were an estimated average.

APPENDIX D-7

PROPOSED RANGELAND DEVELOPMENTS[a]
PROTECTION ALTERNATIVE

Allotment Number	Development[b]	Quantity and Unit	Average Acres Disturbed Per Unit Short-Term	Per Unit Long-Term	Total Short-Term	Total Long-Term	Average Cost Per Unit	Total Cost
7005	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	$ 8,000	$ 8,000
	Fence	1 mi.	1.00	.20	1.00	.20	2,400	2,400
7031	Water Catchment	1	.03	.03	.03	.03	25,000	25,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
7037	Fence	2 1/2 mi.	1.00	.20	2.50	.50	2,400	6,000
7039	Fence	5 1/2 mi.	1.00	.20	5.50	1.10	2,400	13,200
7051	Pipeline	6 mi.	1.50	.10	9.00	.60	5,000	30,000
	Fence	4 mi.	1.00	.20	4.00	.80	2,400	9,600
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
	Storage Tank (20,000 gals.)	3	.30	.05	.90	.15	9,500	28,500
7055	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9002	Fence	2 3/4 mi.	1.00	.20	2.75	.55	2,400	6,600
	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
9008	Pipeline	1/4 mi.	1.50	.10	.38	.03	5,000	1,250
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
9009	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
9010	Fence	4 1/4 mi.	1.00	.20	4.25	.85	2,400	10,200
	Pipeline	1 1/2 mi.	1.50	.10	2.25	.15	5,000	7,500
9012	Fence	1 mi.	1.00	.20	1.00	.20	2,400	2,400
9013	Pipeline	1 1/4 mi.	1.50	.10	1.88	.13	5,000	6,250
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
9031	Fence	4 mi.	1.00	.20	4.00	.80	2,400	9,600
	Pipeline	5 3/4 mi.	1.50	.10	8.63	.58	5,000	28,750
	Well with Pump or Windmill	2	.50	.10	1.00	.20	26,000	52,000
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
	Storage Tank (20,000 gals.)	3	.30	.05	.90	.15	9,500	28,500
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000

APPENDIX D-7 (continued)

PROPOSED RANGELAND DEVELOPMENTS[a]
PROTECTION ALTERNATIVE

Allotment Number	Development[b]	Quantity and Unit	Average Acres Disturbed Per Unit Short-Term	Per Unit Long-Term	Total Short-Term	Total Long-Term	Average Cost Per Unit	Total Cost
9033	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
	Pipeline	6 mi.	1.50	.10	9.00	.60	5,000	30,000
9035	Pipeline	2 1/2 mi.	1.50	.10	3.75	.25	5,000	12,500
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
9036	Pipeline	1 1/2 mi.	1.50	.10	2.25	.15	5,000	7,500
	Fence	1 3/4 mi.	1.00	.20	1.75	.35	2,400	4,200
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9037	Pipeline	1 1/4 mi.	1.50	.10	1.88	.13	5,000	6,250
	Drinking Trough	1	.10	.08	.10	.08	750	750
9038	Pipeline	1 3/4 mi.	1.50	.10	2.63	.18	5,000	8,750
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
9039	Pipeline	2 1/4 mi.	1.50	.10	3.38	.23	$ 5,000	$11,250
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
9040	Fence	7 3/4 mi.	1.00	.20	7.75	1.55	2,400	18,600
	Pipeline	1 1/4 mi.	1.50	.10	1.88	.13	5,000	6,250
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
9042	Fence	4 mi.	1.00	.20	4.00	.80	2,400	9,600
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
9044	Fence	1 1/2 mi.	1.00	.20	1.50	.30	2,400	3,600
	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9046	Pipeline	2 1/4 mi.	1.50	.10	3.38	.23	5,000	11,250
9047	Fence	2 1/2 mi.	1.00	.20	2.50	.50	2,400	6,000
	Pipeline	3/4 mi.	1.50	.10	1.13	.08	5,000	3,750
	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9048	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750

APPENDIX D-7 (continued)

PROPOSED RANGELAND DEVELOPMENTS[a]
PROTECTION ALTERNATIVE

Allotment Number	Development[b]	Quantity and Unit	Average Acres Disturbed Per Unit Short-Term	Per Unit Long-Term	Total Short-Term	Total Long-Term	Average Cost Per Unit	Total Cost
9049	Pipeline	1 3/4 mi.	1.50	.10	2.63	.18	5,000	8,750
	Fence	3/4 mi.	1.00	.20	.75	.15	2,400	1,800
	Drinking Trough	1	.10	.08	.10	.08	750	750
9050*	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
9051	Fence	3/4 mi.	1.00	.20	.75	.15	2,400	1,800
	Pipeline	4 1/4 mi.	1.50	.10	6.38	.43	5,000	21,250
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
9052	Pipeline	3/4 mi.	1.50	.10	1.13	.08	5,000	3,750
	Drinking Trough	1	.10	.08	.10	.08	750	750
9053	Fence	5 1/2 mi.	1.00	.20	5.50	1.10	2,400	13,200
	Pipeline	8 1/2 mi.	1.50	.10	12.75	.85	5,000	42,500
	Well with Pump or Windmill	2	.50	.10	1.00	.20	26,000	52,000
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
9055	Pipeline	1 mi.	1.50	.10	1.50	.10	$ 5,000	$ 5,000
	Earthen Stock Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
9056	Fence	2 3/4 mi.	1.00	.20	2.75	.55	2,400	6,600
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500
9059	Fence	2 1/2 mi.	1.00	.20	2.50	.50	2,400	6,000
9062	Fence	4 1/2 mi.	1.00	.20	4.50	.90	2,400	10,800
9063	Well with Pump or Windmill	1	.50	.10	.50	.10	26,000	26,000
	Fence	5 mi.	1.00	.20	5.00	1.00	2,400	12,000
	Pipeline	4 mi.	1.50	.10	6.00	.40	5,000	20,000
	Storage Tank (20,000 gals.)	1	.30	.05	.30	.05	9,500	9,500

APPENDIX D-7 (concluded)

PROPOSED RANGELAND DEVELOPMENTS[a]/
PROTECTION ALTERNATIVE

Summary

Pipeline	64 miles
Fence	66 miles
Well with Pump or Windmill	12
Storage Tank	11
Drinking Trough	35
Earthen Stock Tank	9
Water Catchment	1

Short-Term Total = 196 acres disturbed
Long-Term Total = 38 acres disturbed
Total Cost = $954,450

Source: BLM Las Cruces District Office Files, 1984.

Notes: *Indicates allotments with Allotment Management Plans.
a/Rangeland developments are proposed for livestock, but wildlife would benefit.
b/Depth of wells and size of storage tanks will vary. The costs were an estimated average.

APPENDIX D-8
ACREAGE AND GRAZING CAPACITY BY ALLOTMENT

Allotment Number	Allotment Name	Management Status[a]	Acres Public Land	Acres Other Ownership	Total Allotment Acreage	Grazing Capacity Total AUMs (Private, State, Federal)	Preference (Federal) AUMs	Percent Public Land Use	Season of Use	Big Game AUMs	5-Year Average Licensed Use
7003	Bosworth, Lanis L.	I	2,507	1,210	3,717	480	336	70	Yearlong	8	175
7005	Cook, Evelyn K. Batte, Bonard M.	I	965	160	1,125	141	60	43	03/01-05/31 12/01-02/28	10	60
7012	Danley, J. W.	I	2,446	870	3,316	605	444	73	Yearlong	-0-	473
7013	Danley, J. Willis	I	5,684	9,203	14,887	2,761	1,139	41	Yearlong	23	1,132
7014	Danley, Osie	I	7,168	2,593	9,761	1,220	792	65	Yearlong	-0-	792
7022*	Hansen, Carl and Bill	I	4,996	920	5,916	384	312	81	03/01-04/30 11/01-02/28	1	306
7030*	Logan, Mary E.	I	5,488	1,360	6,848	772	525	68	03/01-04/30 11/01-02/28	62	525
7031	Bonnell, Bessie B. Walker, Albert	I	4,356	800	5,156	641	332	52	03/01-05/15 11/16-02/28	48	335
7033	Hiles, James V.	I	1,115	914	2,029	409	217	53	Yearlong	-0-	86
7034*	Holcomb, Roy E.	I	25,371	3,955	29,326	2,784	2,364	85	03/01-04/30 11/01-02/28	-0-	1,576
7037	Johnson, B. B.	I	42,297	4,518	46,815	3,102	2,748	89	Yearlong	-0-	2,238
7039	Holcomb, Roy E.	M	19,048	3,666	22,714	3,179	2,616	82	Yearlong	-0-	2,608
7044	Saenz, Richard G.	I	50	160	210	14	14	100	03/01-05/31 11/01-02-29	-0-	14
7050	Nunley, Roy	I	16,002	24,462	40,464	4,332	1,747	40	Yearlong	23	1,748
7051	White Sands Ranch	I	16,559	2,599	19,158	2,199	1,927	88	Yearlong	-0-	1,915
7053	Unallotted		4,585	-0-	4,585	-0-	-0-	-0-		10	
7055	Quatros Amigos Cattle Co.	I	9,829	2,923	12,752	1,272	1,008	79	Yearlong	-0-	901
7056	Anderson, Norman S.	I	1,115	110	1,225	104	96	92	03/01-04/30 11/01-02/28	4	82
7057	Robertson, Lupe M.	M	240	160	400	60	60	100	Yearlong	-0-	60
7065*	Virden, Ben	I	7,285	4,626	11,911	906	552	61	Yearlong	47	554
7066*	Walker, Charles R.	I	5,408	1,219	6,627	648	534	82	03/01-05/31 12/01-02/28	11	540
7067	Bar HW Ranch	I	6,060	5,813	11,873	2,024	876	43	Yearlong	-0-	872
7068	Walker, Wesley and Assoc.	I	5,273	4,415	9,688	1,248	612	49	Yearlong	-0-	612
7069	Walters, Mathew	M	595	612	1,207	174	85	49	Yearlong	5	13
7080*	Permian Exploration Corp.	I	19,399	10,768	30,167	2,976	1,728	58	03/01-05/31 12/01-02/28	13	1,530
7081	Pickard, Robert W.	M	430	-0-	430	36	36	100	Yearlong	-0-	36
7015	Dare Memorial Rest Home	C	1,458	-0-	1,458	72	72	100	Yearlong	49	72
7017	Fairchild, Tom J.	C	3,531	-0-	3,531	168	168	100	Yearlong	32	168
7019	Gardenhire Estate	C	440	-0-	440	60	30	100	03/01-05/31 11/01-02/28	-0-	34
7020	Lewis, Ernest R.	C	160	-0-	160	24	24	100	Yearlong	-0-	24
7028	High Nogal Ranch Inc.	C	1,291	-0-	1,291	108	108	100	Yearlong	-0-	108
7029	Davis, William	C	2,180	-0-	2,180	144	144	100	03/01-05/15 11/16-02/28	41	144
7035	Holcomb, Roy E.	M	40	-0-	40	12	12	100	Yearlong	-0-	12

APPENDIX D-8 (continued)
ACREAGE AND GRAZING CAPACITY BY ALLOTMENT

Allotment Number	Allotment Name	Management Status[a]	Acres Public Land	Acres Other Ownership	Total Allotment Acreage	Grazing Capacity Total AUMs (Private, State, Federal)	Preference (Federal) AUMs	Percent Public Land Use	Season of Use	Big Game AUMs	5-Year Average Licensed Use
7049	Maddoux Family Trust	C	No Grazing								
7052	Bolak, William M.	M	760	-0-	760	96	96	100	03/01-04/30 11/01-02/28	3	75
7054	Phelps, Jasper	M	600	-0-	600	100	100	100	03/01-03/31 11/01-02/28	3	36
7063	Taylor, Donald G.	C	2,160	-0-	2,160	108	108	100	Yearlong	23	108
7070	Weber, Marvin E.	C	80	-0-	80	12	12	100	Yearlong	1	12
7072	Wofford, Dave J.	M	611	-0-	611	36	36	100	03/01-03/31 11/01-02/28	-0-	36
7074	Bar HW	M	60	-0-	60	12	12	100	Yearlong	-0-	12
7075	Green, Leon	M	80	-0-	80	12	12	100	03/01-05/15 11/15-02/28	-0-	12
9001	Bennett, Mrs. Frank	I	9,984	1,143	11,127	2,100	1,824	87	Yearlong	89	1,739
9002	Bennett, James W.	I	6,550	4,092	10,642	1,859	1,284	69	Yearlong	29	1,286
9003	Bennett, Wilson	I	21,937	2,633	24,570	4,800	4,212	88	Yearlong	136	3,905
9004	Brownfield, Frank L.	M	2,776	16,297	19,073	1,504	240	5	Yearlong	-0-	240
9005	Havens, M. M.	I	2,416	250	2,666	480	432	90	Yearlong	92	448
9006*	Cauhape, J. P., Inc.	I	42,781	22,830	65,611	17,477	10,932	62	Yearlong	751	7,526
9008	Dean, Clifton	I	1,982	600	2,582	576	444	77	Yearlong	119	530
9009	Stewart, Frank	I	4,355	1,619	5,974	1,080	792	73	Yearlong	88	703
9010	Smith, Larry B.	I	41,674	66,780	108,454	16,849	6,456	38	Yearlong	511	6,412
9011	Bond, Damon	I	6,309	1,362	7,671	923	732	79	Yearlong	320	729
9012	Rauch, George	I	4,760	4,694	9,454	1,518	837	55	Yearlong	65	715
9013	Duggar, Bryce	I	14,717	24,616	39,333	3,975	1,642	41	Yearlong	114	1,629
9014	Jones, Bob A.	I	7,985	1,427	9,412	1,279	1,056	83	Yearlong	34	1,056
9016	Gage, W. A. and Sons	I	7,289	14,996	22,285	6,194	1,956	32	Yearlong	168	1,925
9018	Hat Ranch, Inc.	I	57,788	31,838	89,626	15,363	10,445	68	Yearlong	318	8,704
9020	Harvey E. Yates Company	I	18,728	13,748	32,476	6,779	3,600	53	Yearlong	1,057	3,595
9021	Hughes Brothers	I	10,478	8,246	18,724	4,327	2,316	54	Yearlong	597	2,920
9023	Lewis, Gaston	I	1,606	1,465	3,071	569	288	51	Yearlong	76	287
9025	Akers, Elmer C.	M	2,065	1,560	3,625	637	356	56	Yearlong	15	363
9026	Jones, Alton and Sons	I	15,461	3,600	19,061	2,255	1,848	82	Yearlong	47	1,851
9027	Jones, Alton and Sons	M	300	2,700	3,000	36	36	100	Yearlong	-0-	36
9028	Jones, Bob	M	6,055	1,280	7,335	1,296	1,044	81	Yearlong	48	1,044
9029	Jones, Bob	I	3,490	6,730	10,220	1,260	480	38	Yearlong	16	480
9030	Jones, William T.	I	10,233	702	10,935	1,731	1,632	94	Yearlong	70	1,624
9031	Mashed O Ranch	I	40,874	18,739	59,613	10,869	7,719	71	Yearlong	219	7,719
9032	Lewis, Andy A.	I	5,529	3,922	9,451	857	588	69	Yearlong	-0-	531
9033	Diamond A Cattle Company	M	19,760	1,898	21,658	2,405	2,106	87	Yearlong	259	1,574
9035	Lewis, Eldo	I	29,833	6,703	36,536	4,511	3,684	82	Yearlong	542	3,024
9036	Lewis, Howell	I	32,942	3,025	35,967	3,423	3,235	95	Yearlong	868	2,991
9037	Lewis, Pearl Prather	I	10,230	4,150	14,380	2,503	1,764	70	Yearlong	51	1,774
9038	Foster and Barker	I	6,125	1,480	7,605	1,066	852	80	Yearlong	237	855
9039	Richardson, Marlin K.	I	15,965	3,345	19,310	3,686	3,048	83	Yearlong	655	2,792

APPENDIX D-8 (concluded)
ACREAGE AND GRAZING CAPACITY BY ALLOTMENT

Allotment Number	Allotment Name	Management Status[a]	Acres Public Land	Acres Other Ownership	Total Allotment Acreage	Grazing Capacity Total AUMs (Private, State, Federal)	Preference (Federal) AUMs	Percent Public Land Use	Season of Use	Big Game AUMs	5-Year Average Licensed Use
9040	Ballantine, Jim E.	I	11,824	1,965	13,789	1,849	1,577	85	Yearlong	366	1,574
9042	Stringer, Ferrel E.	I	7,226	3,892	11,118	1,105	699	63	Yearlong	-0-	690
9044	Kennedy Oil Company	I	3,694	3,844	7,538	2,076	960	46	Yearlong	69	808
9045	Porter, Don I.	I	2,130	720	2,850	615	468	76	Yearlong	91	456
9046	Prather, Bryan	I	19,914	5,055	24,969	4,608	3,957	86	Yearlong	831	3,879
9047	Rauch, George	I	9,905	640	10,545	1,848	1,692	92	Yearlong	701	1,003
9048	Rauch, George	M	6,455	1,600	8,055	1,404	1,109	79	Yearlong	340	842
9049	Runyan-Mershon	I	17,940	18,347	36,287	6,024	3,180	53	Yearlong	423	2,604
9050*	Runyan, Tom W.	I	19,882	4,008	23,890	5,936	5,032	85	Yearlong	648	4,194
9051	Runyan, J. B.	I	24,915	6,812	31,727	5,982	4,668	78	Yearlong	758	4,260
9052	Smith, Alva M. Mrs.	I	1,620	40	1,660	369	361	98	Yearlong	66	361
9053	Snow, Amelia C. Estate	I	38,362	4,449	42,811	6,751	6,080	90	Yearlong	817	5,777
9055	Stewart, Frank	I	5,920	2,085	8,005	1,570	1,188	76	Yearlong	108	1,195
9056	Tanner, Manual	I	6,223	2,401	8,624	1,765	1,332	75	Yearlong	184	1,132
9058	Tanner, T. A.	I	7,391	1,860	9,251	1,775	1,464	82	Yearlong	135	1,456
9059	Taylor, Bill	I	2,478	1,820	4,298	753	420	56	Yearlong	102	424
9062	White, John V.	I	9,519	1,488	11,007	1,842	1,589	86	Yearlong	538	1,588
9063	Schafer, John G.	I	15,107	665	15,772	1,990	1,896	95	Yearlong	253	1,882
9064	Hat Ranch, Inc.	I	38,722	9,546	48,268	9,768	7,992	82	Yearlong	331	7,920
9067	Hughes, Orland	I	4,721	2,217	6,938	1,680	1,118	66	Yearlong	265	1,111
9007	Coupland, Frank	M	720	-0-	720	240	240	100	Yearlong	30	240
9015	Fleming, Benny	M	80	-0-	80	24	24	100	Yearlong	6	24
9017	Lewis, Gaston	M	240	-0-	240	48	48	100	Yearlong	-0-	48
9019	Havens, M. M.	M	80	-0-	80	24	24	100	Yearlong	3	24
9022	Hughes Brothers	M	400	-0-	400	108	108	100	Yearlong	22	108
9024	VK Cattle Company	M	640	-0-	640	168	168	100	Yearlong	11	139
9041	Kennedy Oil Company	M	729	-0-	729	168	168	100	Yearlong	66	151
9043	Merritt, Jack	M	1,456	-0-	1,456	372	372	100	Yearlong	131	372
9054	Gillum, James R.	M	80	-0-	80	24	24	100	Yearlong	6	24
9057	Tanner, S. E.	M	240	-0-	240	36	36	100	Yearlong	10	36
9060	Tidwell, Kenneth	M	1,077	-0-	1,077	192	192	100	Yearlong	197	192
9061	VanCleve, Ruby	M	349	-0-	349	108	108	100	Yearlong	1	108
9065	Magby, Wilma J.	M	120	-0-	120	12	12	100	Yearlong	6	12
9066	Taylor, Bill	M	160	-0-	160	36	36	100	Yearlong	6	36

Source: BLM Las Cruces District Office Files, 1984.

Notes: * - Indicates allotments with Allotment Management Plans.
a/I - Improve Category
M - Maintain Category
C - Custodial Category
For additional information on criteria used for categorizing allotments, see Appendix D-3.

APPENDIX D-9
CARRYING CAPACITY AND MANAGEMENT STATUS BY ALLOTMENT BY ALTERNATIVE[a]

Under the Balanced and Production Alternatives, the figures reflect suggested carrying capacity plus additional AUMs that would be gained through instituting effective grazing management practices and vegetation treatments. Under the Protection Alternative, there are no vegetation treatments. Additional AUMs would be gained through effective grazing management practices. Under the No Livestock Grazing Alternative, all AUMs would be available for big game.

Allotment Number	Allotment Name	Management Status[b]	Balanced		Production		Protection		No Action c/	
			Short-Term AUMs	Long-Term AUMs	Short-Term AUMs	Long-Term AUMs	Short-Term AUMs	Long-Term AUMs	Short-Term AUMs	Long-Term AUMs
7003	Bosworth, Lanis L.	I	224	243	224	243	178	285	175	336
7005	Cook, Evelyn K.	I	41	83	41	83	34	51	60	60
	Batte, Bonard M.									
7012	Danley, J. W.	I	440	162	440	162	422	435	473	444
7013	Danley, J. Willis	I	881	993	881	993	802	968	1,132	1,139
7014	Danley, Osie	I	515	439	515	439	396	634	792	792
7022	Hansen, Carl and Bill	I	233	226	233	226	206	265	306	312
7030	Logan, Mary E.	I	341	580	341	580	262	420	525	525
7031	Bonnell, Bessie B.	I	216	317	216	317	166	266	335	332
	Walker, Albert									
7033	Hiles, James V.	I	163	153	163	153	146	184	86	217
7034	Holcomb, Roy E.	I	1,554	1,119	1,554	2,568	1,212	2,009	1,576	2,364
7037	Johnson, B. B.	I	1,882	1,125	1,882	3,360	1,511	2,253	2,238	2,748
7039	Holcomb, Roy E.	M	1,720	1,513	1,720	2,061	1,341	2,224	2,608	2,616
7044	Saenz, Richard G.	I	11	16	11	16	10	13	14	14
7050	Nunley, Roy	I	1,265	2,306	1,265	2,942	1,066	1,527	1,748	1,747
7051	White Sands Ranch	I	1,273	1,532	1,273	1,874	997	1,638	1,915	1,927
7053	Unallotted			313		313				
7055	Quatros Amigos Cattle Co.	I	655	1,141	655	1,140	504	806	901	1,008
7056	Anderson, Norman S.	I	62	200	62	200	48	77	82	96
7057	Robertson, Lupe M.	M	39	17	39	17	30	48	60	60
7065	Virden, Ben	I	392	645	392	645	331	469	554	552
7066	Walker, Charles R.	I	388	130	388	130	336	454	540	534
7067	Bar HW Ranch	I	584	738	584	738	462	745	872	876
7068	Walker, Wesley and Assoc.	I	429	755	429	755	358	520	612	612
7069	Walters, Mathew	M	56	61	56	61	44	72	13	85
7080	Permian Exploration Corp.	I	1,215	2,181	1,215	2,181	1,002	1,495	1,530	1,728
7081	Pickard, Robert W.	M	23	23	23	23	18	29	36	36
7015	Dare Memorial Rest Home	C	72	72	72	72	72	72	72	72
7017	Fairchild, Tom J.	C	168	168	168	168	168	168	168	168
7019	Gardenhire Estate	C	30	30	30	30	30	30	30	30
7020	Lewis, Ernest R.	C	24	24	24	24	24	24	24	24
7028	High Nogal Ranch Inc.	C	108	108	108	108	108	108	108	108
7029	Davis, William	C	144	144	144	144	144	144	144	144
7035	Holcomb, Roy E.	M	12	12	12	12	12	12	12	12
7049	Maddoux Family Trust	C	No Grazing							
7052	Bolak, William M.	M	96	96	96	96	96	96	96	96
7054	Phelps, Jasper	M	100	100	100	100	100	100	100	100
7063	Taylor, Donald G.	C	108	108	108	108	108	108	108	108

APPENDIX D-9 (continued)
CARRYING CAPACITY AND MANAGEMENT STATUS BY ALLOTMENT BY ALTERNATIVE[a]

Allotment Number	Allotment Name	Management Status[b]	Balanced Short-Term AUMs	Balanced Long-Term AUMs	Production Short-Term AUMs	Production Long-Term AUMs	Protection Short-Term AUMs	Protection Long-Term AUMs	No Action c/ Short-Term AUMs	No Action c/ Long-Term AUMs
7070	Weber, Marvin E.	C	12	12	12	12	12	12	12	12
7072	Wofford, Dave J.	M	36	36	36	36	36	36	36	36
7074	Bar HW	M	12	12	12	12	12	12	12	12
7075	Green, Leon	M	12	12	12	12	12	12	12	12
9001	Bennett, Mrs. Frank	I	1,480	2,129	1,480	2,129	1,391	1,572	1,739	1,824
9002	Bennett, James W.	I	938	751	938	751	815	1,091	1,286	1,284
9003	Bennett, Wilson	I	3,397	5,833	3,397	5,833	3,201	3,612	3,905	4,212
9004	Brownfield, Frank L.	M	160	116	160	190	127	204	240	240
9005	Havens, M. M.	I	359	578	359	578	339	395	448	432
9006	Cauhape, J. P., Inc.	I	10,390	48,395	10,390	48,442	8,910	9,948	7,526	10,932
9008	Dean, Clifton	I	350	281	350	281	324	377	530	444
9009	Stewart, Frank	I	712	1,040	712	1,086	677	746	703	792
9010	Smith, Larry B.	I	5,368	7,360	5,368	7,360	5,036	5,749	6,412	6,456
9011	Bond, Damon	I	513	111	513	220	428	622	729	732
9012	Rauch, George	I	558	1,456	558	1,565	441	711	715	837
9013	Duggar, Bryce	I	1,208	1,202	1,208	1,202	10,55	1,396	1,629	1,642
9014	Jones, Bob A.	I	914	705	914	909	863	975	1,056	1,056
9016	Gage, W. A. and Sons	I	1,596	1,517	1,596	1,517	1,506	1,776	1,925	1,956
9018	Hat Ranch, Inc.	I	8,868	12,813	8,868	13,966	8,460	9,286	8,704	10,445
9020	Harvey E. Yates Company	I	2,356	1,741	2,356	1,990	1,827	3,060	3,595	3,600
9021	Hughes Brothers	I	1,805	2,126	1,805	2,126	1,656	1,969	2,920	2,316
9023	Lewis, Gaston	I	256	489	256	489	248	272	287	288
9025	Akers, Elmer C.	M	273	199	273	233	245	307	363	356
9026	Jones, Alton and Sons	I	1,483	1,464	1,483	1,464	1,372	1,590	1,851	1,848
9027	Jones, Alton and Sons	M	29	980	29	1,119	27	26	36	36
9028	Jones, Bob	M	951	1,281	951	1,474	919	992	1,044	1,044
9029	Jones, Bob	I	370	370	370	405	331	418	480	480
9030	Jones, William T.	I	1,198	1,531	1,198	1,606	1,044	1,387	1,624	1,632
9031	Mashed O Ranch	I	6,476	10,633	6,476	10,633	6,156	6,804	7,719	7,719
9032	Lewis, Andy A.	I	397	349	397	349	319	500	531	588
9033	Diamond A Cattle Company	M	1,396	857	1,396	1,032	1,095	1,796	1,574	2,106
9035	Lewis, Eldo	I	2,500	2,982	2,500	2,982	2,017	3,131	3,024	3,684
9036	Lewis, Howell	I	2,429	2,992	2,429	3,057	2,208	2,750	2,991	3,235
9037	Lewis, Pearl Prather	I	1,594	2,516	1,594	2,516	1,557	1,681	1,774	1,764
9038	Foster and Barker	I	559	446	559	516	435	724	855	852
9039	Richardson, Marlin K.	I	1,981	1,319	1,981	1,429	1,524	2,438	2,792	3,048
9040	Ballantine, Jim E.	I	1,101	1,178	1,101	1,178	915	1,340	1,574	1,577
9042	Stringer, Ferrel E.	I	477	557	477	644	388	594	690	699
9044	Kennedy Oil Company	I	679	608	679	608	571	816	808	960
9045	Porter, Don I.	I	374	527	374	527	351	421	456	468
9046	Prather, Bryan	I	3,522	5,549	3,522	5,549	3,354	3,737	3,879	3,957
9047	Rauch, George	I	1,502	2,536	1,502	2,582	1,421	1,540	1,003	1,692
9048	Rauch, George	M	789	700	789	700	668	943	842	1,109
9049	Runyan-Mershon	I	2,626	4,431	2,626	4,431	2,425	2,899	2,604	3,180
9050	Runyan, Tom W.	I	4,566	5,762	4,566	5,762	4,390	4,790	4,194	5,032

APPENDIX D-9 (concluded)
CARRYING CAPACITY AND MANAGEMENT STATUS BY ALLOTMENT BY ALTERNATIVE a/

Allotment Number	Allotment Name	Management Status b/	Balanced		Production		Protection		No Action c/	
			Short-Term AUMs	Long-Term AUMs	Short-Term AUMs	Long-Term AUMs	Short-Term AUMs	Long-Term AUMs	Short-Term AUMs	Long-Term AUMs
9051	Runyan, J. B.	I	3,611	4,095	3,611	4,095	4,131	4,479	4,260	4,668
9052	Smith, Alva M. Mrs.	I	315	409	315	409	303	338	361	361
9053	Snow, Amelia C. Estate	I	4,664	4,767	4,664	4,767	4,226	5,168	5,777	6,080
9055	Stewart, Frank	I	935	737	935	737	843	1,048	1,195	1,188
9056	Tanner, Manual	I	1,112	1,315	1,112	1,315	1,026	1,222	1,132	1,332
9058	Tanner, T. A.	I	1,251	1,283	1,251	1,283	1,168	1,359	1,456	1,464
9059	Taylor, Bill	I	351	606	351	606	334	386	424	420
9062	White, John V.	I	1,033	886	1,033	886	794	271	1,588	1,589
9063	Schafer, John G.	I	1,329	1,692	1,329	1,692	1,090	1,623	1,882	1,896
9064	Hat Ranch, Inc.	I	6,451	10,164	6,541	10,174	6,174	6,913	7,920	7,992
9067	Hughes, Orland	I	740	489	740	489	581	950	1,111	1,118
9007	Coupland, Frank	M	240	240	240	240	240	240	240	240
9015	Fleming, Benny	M	24	24	24	24	24	24	24	24
9017	Lewis, Gaston	M	48	48	48	48	48	48	48	48
9019	Havens, M. M.	M	24	24	24	24	24	24	24	24
9022	Hughes Brothers	M	108	108	108	108	108	108	108	108
9024	VK Cattle Company	M	168	168	168	168	168	168	168	168
9041	Kennedy Oil Company	M	168	168	168	168	168	168	168	168
9043	Merritt, Jack	M	372	372	372	372	372	372	372	372
9054	Gillum, James R.	M	24	24	24	24	24	24	24	24
9057	Tanner, S. E.	M	36	36	36	36	36	36	36	36
9060	Tidwell, Kenneth	M	192	192	192	192	192	192	192	192
9061	VanCleve, Ruby	M	108	108	108	108	108	108	108	108
9065	Magby, Wilma J.	M	12	12	12	12	12	12	12	12
9066	Taylor, Bill	M	36	36	36	36	36	36	36	36

Source: BLM Las Cruces District Office Files, 1984.

Notes: a/AUM figures are not final stocking rates. All livestock use adjustments would be implemented through documented mutual agreement or by decision, after monitoring.
b/I - Improve Category
M - Maintain Category
C - Custodial Category
For additional information on criteria used for categorizing allotments, see Appendix D-3.
c/The figures shown under the No Action Alternative in the short-term are the 5-year average actual use and the long-term figures correspond to preference.

APPENDIX E

WILDLIFE

APPENDIX E-1

METHODOLOGY -- WILDLIFE

Wildlife and habitat data were compiled during a split inventory with two seasons of inventory completed during 1980 and two seasons of inventory completed during 1982. The basic method of inventory was the BLM's Integrated Habitat Inventory and Classification System (IHICS). BLM personnel conducted the inventory.

BASIC IHICS PROCEDURES

At the time the IHICS inventory was being conducted, the vegetation inventory (see Appendix C-4) was being conducted, including the mapping of vegetation units (Site Write-Up Areas [SWAs]). Habitat sites were named on the basis of dominant vegetation and landform and were mapped so that habitat site boundaries were the same as SWA boundaries. All like habitat sites are then called a Standard Habitat Site (SHS). Verification of SHS's was done on the ground, and by use of aerial photographs and topographic maps. Unlike other Las Cruces District IHICS inventories, the pseudoriparian SHS was inventoried as a range site (see Appendix C), which provided ecological condition information for comparison purposes.

Animal species occurrence data were determined by various methods for each SHS.

Rodent species were trapped on traplines using 100 traps, usually museum specials and large rat traps. Traplines were located in all SHS's. Bats were captured with mist nets located over water (a special habitat feature).

Modified strip transects were used to determine bird species occurrence for most of the smaller birds, including dove and quail. Incidental sightings on birds were also recorded, especially for raptors and raptor nests.

Herptile (amphibians and reptiles) data were accumulated for lizards and diurnal snakes by day searches in potential habitats by turning over rocks and shooting with rubberbands. Road driving at night was used to locate nocturnal species. Toads were located at night by listening for choruses.

SPECIAL HABITAT FEATURES (Table 3-8)

Special habitat features (SHFs) such as waters, caves, cliffs, buildings, etc. were inventoried at the same time that vegetation and animal inventories were made. Records were made on location and type of SHF and location.

APPENDIX E-1

METHODOLOGY -- WILDLIFE

Wildlife and habitat data were compiled during a split inventory with two seasons of inventory completed during 1980 and two seasons of inventory completed during 1982. The basic method of inventory was the BLM's Integrated Habitat Inventory and Classification System (IHICS). BLM personnel conducted the inventory.

BASIC IHICS PROCEDURES

At the time the IHICS inventory was being conducted, the vegetation inventory (see Appendix C-4) was being conducted, including the mapping of vegetation units (Site Write-Up Areas [SWAs]). Habitat sites were named on the basis of dominant vegetation and landform and were mapped so that habitat site boundaries were the same as SWA boundaries. All like habitat sites are then called a Standard Habitat Site (SHS). Verification of SHS's was done on the ground, and by use of aerial photographs and topographic maps. Unlike other Las Cruces District IHICS inventories, the pseudoriparian SHS was inventoried as a range site (see Appendix C), which provided ecological condition information for comparison purposes.

Animal species occurrence data were determined by various methods for each SHS.

Rodent species were trapped on traplines using 100 traps, usually museum specials and large rat traps. Traplines were located in all SHS's. Bats were captured with mist nets located over water (a special habitat feature).

Modified strip transects were used to determine bird species occurrence for most of the smaller birds, including dove and quail. Incidental sightings on birds were also recorded, especially for raptors and raptor nests.

Herptile (amphibians and reptiles) data were accumulated for lizards and diurnal snakes by day searches in potential habitats by turning over rocks and shooting with rubberbands. Road driving at night was used to locate nocturnal species. Toads were located at night by listening for choruses.

SPECIAL HABITAT FEATURES (Table 3-8)

Special habitat features (SHFs) such as waters, caves, cliffs, buildings, etc. were inventoried at the same time that vegetation and animal inventories were made. Records were made on location and type of SHF and location.

STANDARD HABITAT SITE (SHS) COMPARISONS

A relative diversity index is used as the primary basis for calculating impacts. The data used in the diversity calculations is that collected during the vegetation and animal species inventories.

The formula used for calculating the diversity index is that presented by Odum (1963).

$$\sqrt{\frac{\text{cumulative number of species}}{\text{individuals counted}}} = \text{Diversity Index}$$

The diversity index numbers derived by using the above method provide a relative comparison of different areas using the available inventory data. It is assumed that the higher the diversity index number, the better ecosystem conditions are in a defined situation.

Using examples of two hypothetical communities, Community A with 100 individuals (total) of 2 species, and Community B with 200 individuals of 8 species, the diversity index numbers would be .2 for Community A and .56 for Community B under the theory that presence of rare (infrequent) species in an ecosystem represents stability of the community. The examples above show that Community B is more stable than Community A with a higher representation of rare species. An extreme example of the diversity index would be a well-maintained cornfield where the plant diversity is very low, consisting of many individuals of one species, and having low stability. The cornfield population would be subject to heavy damage from adverse weather or by invasion of a disease or pest.

Diversity indices on Tables 3-7 and 4-3 are used to indicate the changes which can be expected with projected changes in ecological condition or other habitat factors.

If a comparison indicates that a diversity index for birds decreases (is a lower number) by increasing ecological condition from poor to fair, it is assumed that habitat conditions are not as favorable for a highly diverse bird assemblage. However, it must be recognized that a change to more grass and less shrubs in the habitat may favor grassland-associated birds, but not shrubland birds. Because of presumed past loss of grassland habitat, it may be desirable to reduce diversity to improve grasslands. The highest diversity index may not be the most desirable management goal for a particular site. Judgments were made on impacts which do not always depend on achieving the highest diversity.

VERTEBRATE SPECIES USE OF SHS'S (Table 3-7)

The total number of species using each SHS was determined by counting total recorded occurrences. Species which, according to available inventory information, occur in only one SHS are shown as being reliant on that SHS.

BROWSE SPECIES PRODUCTION

Production of browse species was determined from the vegetation inventory data. A and B browse species are identified in the Interagency Browse Analysis Handbook for New Mexico. A species may be defined as preferred browse species by big game (and possibly livestock) or as decreasers. B species are intermediate as preference by big game or are increasers. The vegetation inventory data on browse production are considered inadequate for making estimates of big game carrying capacity, but is adequate to make an assessment of the direction and degree of change with changing ecological conditions.

BIG GAME (Map 3-4, Table 3-9, etc.)

The herd unit areas and population levels, both present and optimum, were provided by the New Mexico Department of Game and Fish and agreed on by BLM. Through the use of computers, the populations were distributed by allotment within each population area. Populations and animal unit month (AUM) requirements were further refined for lands managed by BLM.

In the predictions of impacts, production data were totaled for each ecological condition class in each SHS. The projected changes in ecological condition were then used to determine the general changes which could be expected in browse production.

Fecal analysis data were used to determine the amount of browse used by both deer and pronghorn and the demand for big game AUMs of browse production was further refined using only the amount of browse in each species diet.

AUMs were determined by using 5 deer per AUM and 7 pronghorn per AUM.

The information on Table 3-9 is derived from the actual sightings of deer and pronghorn recorded during the inventory, except that twice as many deer were observed in the pseudoriparian habitat type than is indicated on the table. The writer felt that road locations may have created a bias toward deer observations in the pseudoriparian habitat type, so the observation records were divided by 2 simply on judgment.

SMALL GAME

Small game data were developed through the IHICS inventory process.

IN REPLY REFER TO:

6840 (037)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
LAS CRUCES DISTRICT OFFICE
P.O. Box 1420
Las Cruces, New Mexico 88001

November 8, 1984

John Peterson
U.S. Fish and Wildlife Service
Ecological Services
P. O. Box 4487
Albuquerque, NM 87196

Dear Mr. Peterson:

Pursuant to the November 7, 1984, telephone conversation between Brian Hansen of your office and Mike Howard of this office, the BLM Las Cruces District, White Sands Resource Area, wishes to initiate Informal Section 7 Consultation and request a list of Federally-endangered and threatened species, and any proposed or candidate species for the White Sands Resource Management Plan (RMP) now in preparation. The area of concern for this document is those portions of Otero, Lincoln, Chaves, Eddy, and Sierra Counties, New Mexico, within the White Sands Resource Area. (See enclosed map.)

Sierra County was originally addressed in the Southern Rio Grande Management Framework Plan and covered under Formal Consultation. (See enclosed list and biological opinion dated December 15, 1980 and August 3, 1981.) However, we would like to include Sierra County in this consultation to consider any new listed, proposed, or candidate species. Decisions from the Southern Rio Grande Environmental Impact Statement (EIS) will be carried forward in the White Sands RMP and new issues will be addressed as well. In addition, the area of McGregor Range (Fort Bliss Military Reservation) in Otero County was also covered under a separate document and Section 7 Consultation. (See enclosed species list dated January 11, 1980.) Decisions of the McGregor Range Grazing EIS are also being carried forward in this document, so we would like to include this area in the consultation for the same reason as Sierra County. The area of White Sands Missile Range is not addressed in the White Sands RMP.

Enclosed with this letter are Chapters 1 and 2 of the Draft White Sands RMP to provide background information. If you have problems or require any further information, please contact Mike Howard at FTS 571-8353 or Commercial (505) 523-5571.

Sincerely yours,

Daniel C. B. Rathbun
District Manager

Enclosures (5)

IN REPLY REFER TO:

United States Department of the Interior

6840 (037)

BUREAU OF LAND MANAGEMENT
LAS CRUCES DISTRICT OFFICE
P.O. Box 1420
Las Cruces, New Mexico 88001

November 8, 1984

Harold Olson
New Mexico Department of Game and Fish
Villagra Building
Santa Fe, NM 87503

Dear Mr. Olson:

Pursuant to the November 7, 1984, telephone conversation between Bill Baltosser of your office and Mike Howard of this office, I would like to request a list of State-endangered species for consideration in the White Sands Resource Management Plan (RMP). This is a major planning effort covering public lands in Sierra, Otero, and parts of Lincoln, Chaves, and Eddy Counties. (See enclosed map.) I have enclosed Chapters 1 and 2 of the Draft RMP that will provide some background into what the document will address. If you have any problems or require further information, please contact Mike Howard at (505) 523-5571.

Sincerely yours,

Daniel C. B. Rathbun
District Manager

Enclosures (3)

GOVERNOR
TONEY ANAYA
DIRECTOR AND SECRETARY
TO THE COMMISSION
HAROLD F. OLSON

State of New Mexico

STATE GAME COMMISSION
JAMES H. KOCH, CHAIRMAN
SANTA FE
A. H. GUTIERREZ, JR., M. D.
CARLSBAD
CHRISTINE DiGREGORIO
GALLUP
THOMAS P. ARVAS, O.D.
ALBUQUERQUE
JAKE ALCON
ALBUQUERQUE

DEPARTMENT OF GAME AND FISH

STATE CAPITOL
SANTA FE
87503

November 16, 1984

Mr. Daniel C. B. Rathbun
Bureau of Land Management
P. O. Box 1420
Las Cruces, New Mexico 88001

Dear Dan:

I am in receipt of your letter of November 8, 1984, in which you ask for a list of state-endangered species from the White Sands Resource Management Area. The species in question are as follows (see attached list for scientific names):

Species of Known or Suspected Regular Occurrence

black-tailed prairie dog	whooping crane
olivaceous cormorant	McCown's longspur
bald eagle	Trans-Pecos rat snake
peregrine falcon	

Species of Possible or Irregular Occurrence

black-footed ferret	elegant trogon
bighorn sheep	Bell's vireo
Mississippi kite	gray vireo
common black-hawk	Baird's sparrow
aplomado falcon	Sonoran mountain king snake
least tern	rock rattlesnake
common ground-dove	

Our major concerns are with those species in the first group (above); however, should populations be discovered of those in the second group, needless to say their needs should also be addressed.

Sincerely,

Harold Olson by JPH

Harold F. Olson
Director

jph

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Field Supervisor
Ecological Services, USFWS
Post Office Box 4487
Albuquerque, New Mexico 87196

BLM LAS CRUCES DISTRICT NM-030

ES/LS #2-22-85-I-019

January 2, 1984

Memorandum

To: District Manager, Bureau of Land Management
Las Cruces District Office, Las Cruces, New Mexico

From: Field Supervisor, FWS, Ecological Services,
Albuquerque, New Mexico

Subject: Endangered species information for the White Sands
Resource Management Plan (BLM)

This is in response to your letter dated November 8, 1984, concerning the BLM's White Sands Resource Management Plan (RMP). As provided by Section 7 of the Endangered Species Act, the Fish and Wildlife Service (FWS) furnishes, upon request, a list of Federally listed and proposed species that may be affected by Federal actions. We have used the information in your request to narrow the list of candidate, proposed and listed species within the White Sands Resource Area, which includes portions of Otero, Lincoln, Chaves, Eddy and Sierra Counties, New Mexico, to those that potentially may be affected by your proposed action. These are the Kuenzler hedgehog cactus and the prickly poppy (see enclosure).

The Endangered Species Act (Section 7) requires Federal agencies to consult the FWS on any action which may affect listed species or their habitat. In addition, the Act requires Federal agencies to confer with the FWS on any agency action likely to either jeopardize the continued existence of any proposed species or adversely modify proposed critical habitat. The purpose of this requirement is to identify and resolve, at the early planning stage, any adverse affects.

Candidate species have no legal protection under the Endangered Species Act, but are species for which the Service has substantial information to support their listing as endangered or threatened. The development and publication of proposed rules for such species is anticipated. They are included in this document for planning purposes only.

If the Federal action involves construction that significantly affects the quality of the human environment, the Federal agency authorizing, funding, or carrying out the action will conduct a biological assessment. The assessment should state how the action will affect listed or proposed species. Preparation of the assessment may begin upon receipt of the FWS's species list.

The biological assessment shall be completed within 180 days after receipt of the species list, unless it is mutually agreed to extend this period. If the assessment is not initiated within 90 days after receipt of the species list, we suggest its accuracy be verified before conducting the assessment.

The biological assessment should include as a minimum:

1) onsite inspection of the area affected by the proposed action. This inspection should include a detailed survey of the area to determine if species are present and if suitable habitat exists for either expanding the existing population or potential reintroductions of populations;

2) interviews with recognized experts on the species including personnel of the FWS, State conservation departments, universities, and others who may have data not yet found in scientific literature;

3) review literature and other scientific data to determine the species distribution, habitat needs, and other biological requirements;

4) review and analysis of the effects of the proposed action on individuals and populations, including consideration of both direct and indirect effects of the proposal on the species and its habitat;

5) analysis of alternative actions that may promote conservation of the species;

6) other relevant information;

7) written report documenting the assessment results.

If the Federal action does not significantly affect the quality of the human environment, there is no need to prepare a biological assessment. However, it remains incumbent upon the Federal agency to assess whether its action may affect endangered and threatened species.

If the Federal agency determines its proposed action may affect listed species, the Federal agency shall initiate formal Section 7 consultation by writing to the Field Supervisor, Ecological Services, FWS, P.O. Box 4487, Albuquerque, New Mexico 87196. If no effect is evident, there is no need for further consultation. However, I would appreciate the opportunity to review the assessment.

We suggest you contact the New Mexico Department of Game and Fish and the New Mexico Natural Heritage Program for information concerning fish, wildlife and plants of State concern.

If you have any questions, please call Gerry Roehm at (505) 766-3966 or FTS 474-3966.

John C. Peterson

Enclosure

cc: (w/cy encl)
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Heritage Program, New Mexico Natural Resources Department, Santa Fe, New Mexico
Regional Director, FWS, HR and SE, Albuquerque, New Mexico

White Sands Resource Management Plan
Otero, Lincoln, Chaves, Eddy and Sierra Counties,
New Mexico

Listed Species

1. Kuenzler hedgehog cactus
   Echinocereus kuenzleri

   This endangered plant is found along the eastern edge of the Sacramento Mountains in southwestern Chaves and adjacent Otero counties, between 5,800-6,200 feet elevation.

   Authority: Paul Knight, New Mexico Heritage Program, Santa Fe, New Mexico, 87503, (505) 827-7866.

Proposed Species

None

Candidate Species

1. Prickly poppy
   Argemone pleiacantha ssp. *pinnatisecta*

   This candidate plant is found in the Sacramento Mountains in moist, semi-riparian canyons with surrounding vegetation of the Chihuahuan Desert influence at 6,000-6,800 feet elevation.

APPENDIX E-3
BIG GAME POPULATIONS BY ALLOTMENT FOR THE WHITE SANDS RESOURCE AREA[a]

Allotment Number	Present					Optimum					Federal Acres in Deer Herd Units	Other Acres in Deer Herd Units	Total Allotment Acres in Herd Units	Federal Acres in Pronghorn Herd Units	Other Acres in Pronghorn Herd Units	Total Allotment Acres in Pronghorn Herd Units
	Deer Population	Federal AUMs	Pronghorn Population	Federal AUMs	Total Big Game AUMs	Deer Population	Federal AUMs	Pronghorn Population	Federal AUMs	Total Big Game AUMs						
7003	3	8	0	0	8	14	35	0	0	35	2,025	1,287	3,312	0	0	0
7005	4	10	0	0	10	4	10	0	0	10	932	157	1,089	0	0	0
7013	10	23	0	0	23	22	53	0	0	53	3,531	7,982	11,513	0	0	0
7015	20	49	0	0	49	23	56	0	0	56	1,409	0	1,409	0	0	0
7017	13	32	0	0	32	21	51	0	0	51	2,630	0	2,630	0	0	0
7022	1	1	0	0	1	4	11	0	0	11	561	170	731	0	0	0
7029	17	41	0	0	41	18	41	0	0	41	1,844	0	1,844	0	0	0
7030	26	62	0	0	62	26	62	0	0	62	5,536	1,969	7,505	0	0	0
7031	20	48	0	0	48	20	48	0	0	48	4,248	834	5,082	0	0	0
7050	10	23	0	0	23	95	228	0	0	228	12,192	12,681	24,873	0	0	0
7052	1	3	0	0	3	1	3	0	0	3	258	0	258	0	0	0
7053	4	10	0	0	10	4	10	0	0	10	887	21	908	0	0	0
7054	1	3	0	0	3	1	3	0	0	3	281	0	281	0	0	0
7056	2	4	0	0	4	2	4	0	0	4	321	180	501	0	0	0
7063	10	23	0	0	23	16	38	0	0	38	2,160	0	2,160	0	0	0
7065	20	47	0	0	47	20	47	0	0	47	4,164	3,520	7,684	0	0	0
7066	5	11	0	0	11	17	41	0	0	41	2,490	5,417	7,907	0	0	0
7069	2	5	0	0	5	2	5	0	0	5	404	672	1,076	0	0	0
7070	1	1	0	0	1	1	1	0	0	1	77	0	77	0	0	0
7080	6	13	0	0	13	56	134	0	0	134	7,155	4,968	12,123	0	0	0
9001	17	40	29	49	89	66	159	66	113	272	10,569	1,164	11,733	10,568	1,163	11,731
9002	0	0	17	29	29	0	0	39	66	66	0	0	0	6,176	3,080	9,256
9003	14	33	60	103	136	54	131	138	236	367	8,717	328	9,045	22,038	3,220	25,258
9005	39	92	0	0	92	88	210	0	0	210	2,240	237	2,477	0	0	0
9006	313	751	0	0	751	1,385	3,324	0	0	3,324	35,458	18,146	53,604	0	0	0
9007	12	30	0	0	30	28	67	0	0	67	715	3	718	0	0	0
9008	50	119	0	0	119	73	175	0	0	175	2,124	586	2,710	0	0	0
9009	37	88	0	0	88	136	326	0	0	326	1,411	1,627	3,038	0	0	0
9010	149	358	89	153	511	253	607	204	349	956	18,922	17,259	36,181	32,576	62,936	95,512
9011	132	317	2	3	320	220	528	4	6	534	5,633	1,304	6,937	560	0	560
9012	27	65	0	0	65	126	302	0	0	302	3,456	4,413	7,869	0	0	0
9013	41	98	9	16	114	41	98	22	37	135	3,265	1,348	4,613	3,442	1,075	4,517
9014	0	0	20	34	34	0	0	45	77	77	0	0	0	7,205	1,902	9,107
9015	2	6	0	0	6	3	7	0	0	7	79	0	79	0	0	0
9016	70	168	0	0	168	282	676	0	0	676	7,214	14,966	22,180	0	0	0
9018	23	56	153	262	318	93	222	349	598	820	14,805	3,150	17,955	55,803	32,241	88,044
9019	1	3	0	0	3	3	7	0	0	7	79	33	112	0	0	0
9020	441	1,057	0	0	1,057	668	1,626	0	0	1,626	17,915	13,898	31,813	0	0	0
9021	249	597	0	0	597	353	848	0	0	848	10,219	8,376	18,595	0	0	0
9022	9	21	0	0	21	13	31	0	0	31	379	0	379	0	0	0
9023	31	76	0	0	76	72	172	0	0	172	1,831	1,564	3,395	0	0	0
9024	4	11	0	0	11	8	19	0	0	19	200	37	237	0	0	0
9025	3	7	5	8	15	11	27	11	19	46	1,772	1,581	3,353	1,772	1,581	3,353
9026	1	3	26	44	47	5	11	59	100	111	6,440	1,480	7,920	6,440	1,480	7,920
9028	8	20	17	28	48	33	79	38	65	144	5,271	1,154	6,425	6,069	1,324	7,393
9029	0	0	9	16	16	0	0	22	37	37	0	0	0	3,457	7,389	10,846

APPENDIX E-3 (concluded)
BIG GAME POPULATIONS BY ALLOTMENT FOR THE WHITE SANDS RESOURCE AREA[a/]

Allotment Number	Present					Optimum					Federal Acres in Deer Herd Units	Other Acres in Oeer Herd Units	Total Allotment Acres in Herd Units	Federal Acres in Pronghorn Herd Units	Other Acres in Pronghorn Herd Units	Total Allotment Acres in Pronghorn Herd Units
	Deer Population	Federal AUMs	Pronghorn Population	Federal AUMs	Total Big Game AUMs	Deer Population	Federal AUMs	Pronghorn Population	Federal AUMs	Total Big Game AUMs						
9030	9	21	29	49	70	36	85	65	112	197	5,695	277	5,972	10,440	695	11,135
9031	7	16	119	203	219	35	83	271	465	548	2,776	36	2,812	43,368	19,416	62,784
9033	108	259	0	0	259	158	380	0	0	380	4,606	141	4,747	0	0	0
9035	226	542	0	0	542	388	931	0	0	931	16,149	3,993	20,142	0	0	0
9036	357	856	7	12	868	406	974	16	28	1,002	29,127	3,637	32,764	2,608	702	3,310
9037	0	0	30	51	51	0	0	68	116	116	0	0	0	10,856	3,830	14,686
9038	99	237	0	0	237	164	395	0	0	395	4,208	15	4,223	0	0	0
9039	273	655	0	0	655	438	1,051	0	0	1,051	11,652	1,986	13,638	0	0	0
9040	153	366	0	0	366	255	611	0	0	611	6,515	1,257	7,772	0	0	0
9041	27	66	0	0	66	57	137	0	0	137	1,466	0	1,466	0	0	0
9043	55	131	0	0	131	113	271	0	0	271	2,894	2	2,896	0	0	0
9044	29	69	0	0	69	143	344	0	0	344	3,670	3,987	7,657	0	0	0
9045	38	91	0	0	91	86	207	0	0	207	2,212	811	3,023	0	0	0
9046	346	829	1	2	831	776	1,863	2	4	1,867	21,182	7,141	28,323	351	285	636
9047	282	676	15	25	701	432	1,038	33	57	1,095	11,180	754	11,934	5,333	688	6,021
9048	142	340	0	0	340	236	567	0	0	567	6,045	1,532	7,577	0	0	0
9049	176	423	0	0	423	552	1,326	0	0	1,326	17,622	18,226	35,848	0	0	0
9050	270	648	0	0	648	771	1,851	0	0	1,851	19,749	3,431	23,180	0	0	0
9051	316	758	0	0	758	909	2,180	0	0	2,180	24,991	8,112	33,103	0	0	0
9052	28	66	0	0	66	63	151	0	0	151	1,606	42	1,648	0	0	0
9053	325	781	21	36	817	403	968	48	82	1,050	26,188	5,706	31,894	7,657	1,041	8,698
9054	2	6	0	0	6	3	8	0	0	8	80	0	80	0	0	0
9055	45	108	0	0	108	225	541	0	0	541	5,768	2,341	8,109	0	0	0
9056	76	184	0	0	184	236	567	0	0	567	7,323	2,355	9,678	0	0	0
9057	4	10	0	0	10	9	23	0	0	23	240	0	240	0	0	0
9058	56	135	0	0	135	255	611	0	0	611	6,113	1,929	8,042	0	0	0
9059	43	102	0	0	102	97	232	0	0	232	2,473	1,767	4,240	0	0	0
9060	82	197	0	0	197	82	197	0	0	197	2,101	0	2,101	0	0	0
9061	1	1	0	0	1	5	13	0	0	13	668	63	731	0	0	0
9062	224	538	0	0	538	374	897	0	0	897	9,569	1,512	11,081	0	0	0
9063	105	253	0	0	253	175	419	0	0	419	9,261	834	10,095	0	0	0
9064	86	207	73	124	331	135	325	166	285	610	16,804	4,548	21,352	26,555	6,615	33,170
9065	3	6	0	0	6	4	9	0	0	9	107	0	107	0	0	0
9066	3	6	0	0	6	6	14	0	0	14	154	0	154	0	0	0
9067	110	265	0	0	265	180	432	0	0	432	4,704	2,330	7,034	0	0	0
TOTAL	5,955	14,281	731	1,247	15,528	12,588	30,234	1,666	2,852	33,086	496,717	211,277	707,994	263,274	150,663	413,937

Source: BLM Las Cruces District Office Files, 1984.

Note: a/Allotments which have no deer or pronghorn populations include:

7012	7028	7037	7051	7068	7081	9032
7014	7033	7039	7055	7072	9004	9042
7019	7034	7044	7057	7074	9017	
7020	7035	7049	7067	7075	9027	

APPENDIX F

RECREATION

APPENDIX F

RECREATION OPPORTUNITY SPECTRUM INVENTORY AND EVALUATION PROCESS

The Recreation Opportunity Spectrum (ROS) provides a framework for inventory planning and management of the recreation resource. The ROS recognizes that people differ in their needs and the experience they desire. Also, the resource base is not uniform; it varies with its potential for providing recreational experiences (i.e., recreational opportunities available on Elephant Butte Reservoir are not the same as those available in the Cornudas Mountains). The ROS allows managers to characterize all possible combinations of recreational opportunities and resources and arrange combinations of activity, setting, and experience opportunities along a continuum. Once these opportunities have been defined, managers are able to ensure that these opportunities are provided and are able to assess the impacts of other resource actions on the recreation resource.

To facilitate its use in planning, the ROS is divided into six classes which are defined in a combination of activity, setting, and experience opportunities. Evaluation of ROS classes is based upon their application against specific criteria. These are:

1. Remoteness. The distance the area is from roads.

2. Size. The size of an area provides a partial measure of the opportunity to experience feelings of isolation and self-reliance.

3. Evidence of Human Use. The extent to which the natural scenery has been modified by land treatments or construction of structures.

4. Social Setting. The number and types of contacts between recreationists.

5. Managerial Setting. The type and extent of facilities provided to support recreation use and the type of restrictions imposed on recreationists by the managing agency.

Using this system, the predicted impacts of each proposal are anticipated and extreme impacts to the recreation resource are mitigated through the planning and design stage. For a more thorough discussion of the ROS procedures, see BLM Manual, Section 8500.

APPENDIX F (continued)

THE RECREATION OPPORTUNITY SPECTRUM CLASS DESCRIPTIONS

Opportunity Class	Experience Opportunity	Setting Opportunity	Activity Opportunity[a/]
Primitive	Opportunity for isolation from the sights and sounds of man, to feel a part of the natural environment, to have a high degree of challenge and risk, and to use outdoor skills.	Area is characterized by an essentially unmodified natural environment of fairly large size. Concentration of users is very low. Only facilities essential for resource protection are used. Spacing of groups is informal and dispersed to minimize contacts between groups. Motorized use within the area is not permitted.	Camping Hiking Climbing Enjoying Scenery or Natural Features Nature Study Photography Horseback Riding Spelunking Hunting (big game, small game, upland bird, waterfowl) Ski Touring and Snowshoeing Swimming Diving (Skin and Scuba) Fishing Canoeing Sailing River Running (nonmotorized craft)
Semiprimitive Nonmotorized	Some opportunity for isolation from the sights and sounds of man, but not as important as for primitive opportunities. Opportunity to have a high degree of interaction with the natural environment, to have moderate challenge and risk, and to use outdoor skills.	Area is characterized by a predominantly unmodified natural environment of moderate to large size. Concentration of users is low and on-site restrictions are subtle. Facilities are provided for the protection of resource values and the safety of users only. Spacing of groups may be formalized to disperse use and limit contacts between groups. Motorized use is not permitted.	
Semiprimitive Motorized	Some opportunity for isolation from the sights and sounds of man. Opportunity to have a high degree of interaction with the natural environment, to have moderate challenge and risk, and to use outdoor skills. Explicit opportunity to use motorized equipment while in the area.	Area is characterized by a predominantly unmodified natural environment of moderate to large size. Concentration of users is low and on-site restrictions are subtle. Facilities are provided for the protection of resource values and the safety of users only. Spacing of groups may be formalized to disperse use and limit contacts between groups. Motorized use is permitted.	Same as the above, plus the following: Off-Road Vehicle Use (4-wheel drive, dune buggy, dirt bike, snowmobile) Power Boating
Roaded Natural	About equal opportunities for affiliation with other groups and for isolation from the sights and sounds of man. Opportunity to have a high degree of interaction with the natural environment. Challenge and risk opportunities are not very important. Practice of outdoor skills may be important. Opportunities for both motorized and nonmotorized recreation are present.	Area is characterized by a generally natural environment. Resource modification and utilization practices harmonize with the natural environment. Concentration of users is low to moderate. Rustic facilities are provided for user convenience as well as for safety and resource protection. Conventional motorized use is provided for in construction standards and design of facilities.	All activities listed previously plus the following: Picnicking Rock Collecting Wood Gathering Auto Touring Downhill Skiing Snowplay Ice Skating Water Skiing and Other Water Sports Hang Gliding Interpretive Use Rustic Resorts and Organized Camps

APPENDIX F (concluded)

THE RECREATION OPPORTUNITY SPECTRUM CLASS DESCRIPTIONS

Opportunity Class	Experience Opportunity	Setting Opportunity	Activity Opportunity[a/]
Rural	Opportunities to experience affiliation with individuals and groups are prevalent as is the convenience of sites and opportunities. These factors are generally more important than the natural setting. Opportunities for wildland challenges, risk-taking, and testing of outdoor skills are unimportant.	Area is characterized by a substantially modified natural environment. Resource modification and utilization practices are obvious. The concentration of users is often moderate to high. A considerable number of facilities are present. Facilities are often provided for specific activities and are designed for moderate to high use. Facilities for intensive motorized use are available.	All activities listed previously plus the following: Competition Games Spectator Sports Bicycling Jogging Outdoor Concerts Modern Resorts
Modern Urban	Opportunities to experience affiliation with individuals and groups are prevalent as is the convenience of sites and opportunities. Experiencing the natural environment and the use of outdoor skills are largely unimportant.	Area is characterized by a highly modified environment. Vegetation is often exotic and manicured. Sights and sounds of man, on-site, are predominant. Large numbers of users can be expected. Modern facilities are provided for the use and convenience of large numbers of people. Controls and restrictions are obvious and numerous. Facilities for high intensity motor use and parking are present with forms of mass transit often available.	All activities listed previously.

Source: BLM Las Cruces District Office Files, 1984.

Note: a/This listing of activity opportunities is provided for illustrative purposes. It is not an all-inclusive list of activity opportunities on the public land.

APPENDIX G

VISUAL RESOURCES

APPENDIX G

VISUAL RESOURCES INVENTORY AND EVALUATION PROCESS

The BLM's Visual Resource Management (VRM) program functions in two ways. First, all public land is inventoried and the visual resources evaluated. The end result is the identification of VRM classes. Second, the program provides the framework for evaluation of proposed projects relative to their anticipated impact on the visual resource. The contrast rating system is used to make this evaluation.

Inventory

Evaluation of the scenic quality of a landscape, the visual sensitivity of that landscape to change, and the distance of the landscape from a viewer determines the final VRM class. A discussion of each aspect of this evaluation follows.

Scenic Quality

Perhaps scenic quality is best described as the overall impression one retains after driving through or walking through an area. During the inventory, an area is divided into units which are primarily homogeneous in terms of landforms, vegetation, and structures. Each of these units are then evaluated in terms of seven key factors (landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications). Rating scores are assigned to each factor according to uniform criteria. The sum of the rating scores are translated into three scenic quality classes: A, B, or C.

Visual Sensitivity

Sensitivity of the landscape is measured in terms of the degree of concern expressed by the public toward scenic quality. A matrix combines user attitude and use volume to an overall rating of high, medium, or low sensitivity.

Distance Zones

Distance zones are determined in the field by traveling along each major route and observing the area that can be viewed. The areas are defined as the foreground/middle ground, background, or seldom seen.

Management Classes

VRM classes describe the different degree of modification allowed in the basic elements of the landscape. These classes are determined through a matrix which combines scenic quality, visual sensitivity, and distance zones. The resulting classes are mapped and become the basis used to assess the impact of proposed activities. Map 3-6 illustrates the final classes and describes the degree of modification allowed in each class.

Contrast Rating System

The degree to which a proposed project affects the visual quality of the landscape depends on the amount of visual contrast that is created between the activity and the existing landscape. The contrast rating system is used to assess this contrast.

The system reduces a landscape to its major features (land and water, vegetation, and structures) and each feature into its basic elements (form, line, color, and texture). The predicted contrast of the proposal against each landscape feature then indicates the total anticipated visual impact.

For each management class, there are maximum acceptable ratings for each element and any one feature.

Conclusion

Using this system, the predicted impacts of each proposal are anticipated and extreme visual contrasts are mitigated during the planning and design stage. For a more thorough discussion of the Visual Resource Management procedures, see BLM Manual Sections 8411 and 8431.

APPENDIX H

CULTURAL RESOURCES

APPENDIX H

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

DISTRICT OFFICE
P. O. BOX 1420
LAS CRUCES, NEW MEXICO 88004

IN REPLY
REFER TO:

1600

MAY 4 1984

Mr. Tom Merlan
New Mexico, SHPO
Villa Rivera, Room 101
228 East Palace Avenue
Santa Fe, NM 87503

Dear Mr. Merlan:

We are enclosing a map prepared by our District Archaeologist for the White Sands RMP. It shows the anticipated archaeological site density in the RMP area as well as areas where no inferences can be made due to a lack of data. I will now explain the various areas on a case by case basis.

1. This area has had very little survey; however, it is close to some major drainages and receives fairly high rainfall. From brief visits to the area it appears to have a fairly high potential for containing pithouse sites.

2. Various major drainages coming out of the Black Range. Existing data and the Black Range survey indicate that these drainages have high site densities.

3. This contains mainly the foothills of the Black Range. The only work of any significance in these areas is the Black Range study and the UNM field school of the last few seasons. These studies have not been published. There are only scattered BLM parcels in these areas, with the area between Hillsboro and Winston on the Ladder Ranch being almost entirely private land. The only BLM action anticipated in this area would be the sale of scattered tracts which are surveyed prior to sale.

4. Herbert Yoe located a number of fair sized sites in this basin.

5. Surveys for seismograph lines have indicated a high site density in the area northeast of Nutt. They are mainly lithic quarries and lithic scatters.

6. Numerous seismograph lines in the creosote flats between the Rio Grande and the foothills of the Black Range have revealed very few isolated finds and almost no sites. There are almost no resources on the flats of interest to a prehistoric population and only a few of the largest drainages would have sufficient water to attract occupation.

7. The valley of the Rio Grande has a high site density according to BLM records. Almost all of it is private land.

8. Almost no survey has been conducted in the Caballo mountains, and no estimate of the archaeological potential can be made.

9. Several survey blocks for the Radium Springs survey fell within the area of the creosote flats east of the Caballos, no sites were located in this area. There are few resources present and little water, a low site density is anticipated.

10. This area along Jornada Draw has a possible high site density due to a major water course and the presence of mesquite, there has been little survey in this area.

11. Based on the Radium Springs survey and seismograph work the mesquite dune belt west of the San Andres mountains appears to have a high site density.

12. There is no survey data for this area to make a determination.

13. Based on limited BLM survey, this area appears to have a possibly high site density especially in mesquite dune areas along draws.

14. BLM range surveys and seismograph lines have revealed very few sites in the creosote belt along the slopes of the west side of the San Andres.

15. The canyons of the San Andres have a possible high site density; however, within a mile or two the White Sands Missile Range starts.

16. There is no survey data for this area.

17. Very little survey data exists for this area, away from drainages it will probably have a low site density.

18. The Three Rivers Drainage is known to have a high site density.

19. The area close to the Sacramento mountains possibly has a high density based on favorable environmental conditions, there is no survey data for this area.

20. Based on the BLM survey of Rattlesnake Hills, various surveys in the BLM files, and Beckes survey of McGregor Range, this area has a probable high site density.

21. There is no survey data for this area. The BLM land is small parcels that will probably be sold after being surveyed.

22. While there have been few surveys in this area it consists mainly of creosote flats with no potential water sources. Prehistorically if it was used, it was probably used for hunting of antelope and bison. Our wildlife biologist feels that there is little doubt that during the Archaic and earlier this was a large grassland containing bison. This area is close to being placed in the insufficient data category.

23. The Cornudas mountains are known to contain several large petroglyph sites and probably contain a number of base camps for Apache and Mogollon groups.

24. This area is similar to area 22 except for several ranges of low hills and a few sites have been located in this area from limited seismograph testing.

25. This area contains the foothills and base of the Guadalupes as well as a series of playa lakes that are likely to have Paleo Indian sites associated with them. A number of sites have been located in this area.

26. There has been no previous work conducted in this area.

The cultural resource recommendations for the planning effort are contained in special management areas in the upcoming RMP. A number of opportunities were identified in the initial planning process. The areas follows.

1. Designate the Rattlesnake Hill archaeological district as closed to ORV traffic. The area is T. 22 S., R. 8 E., Sec. 21. Originally this area was larger. However, the District Archaeologist determined that it was not as extensive as reported by Kim Way and that Way had surveyed half a section of state land in her 1977 survey.

2. Designate the Alamo Mountain petroglyph as limited to ORV travel on existing roads and trails. The area is T. 26 S., R. 13 E., Section 19, Sec. 20, Sec. 17, Sec. 18. Nominate the site to the National Register of Historic Places.

3. Conduct a stratified random sample of the Alkali Lakes area to determine if Paleo Indian occupation is present in the area. These lakes are the eastern most large playas in the country. This opportunity was rejected by management because the inventory phase of the RMP has passed.

4. Monument those portions of the Butterfield and Jornada del Muerto Trail on public land and limit major surface disturbing activities to more than ¼ mile of each side of the center of well preserved ruts.

5. Designate a portion of the Jarilla Mountains as limited to ORV use to existing roads and trails because of the presence of a large Jornada Mogollon pueblo. The area is T. 21 S., R. 8 E., Sec. 15.

6. Designate the area around Lone Butte as limited to ORV use to existing roads and trails. The area is T. 19 S., R. 9 E., Sec. 6, and T. 19 S., R. 8 E., Sec. 1.

7. Fence several sites on McGregor Range to prevent surface disturbance. The sites are the Escondido site T. 19 S., R. 10 E., Sec. 29 & 30 (20 acres); 030-200 T. 19 S., R. 10 E., Sec. 35 (40 acres); 030-785 T. 19 S., R. 10 E., Sec. 35 (20 acres); 030-1833 T. 20 S., R. 10 E., Sec. 9 (20 acres).

8. Amend the Three Rivers Management Plan to recommend fencing the entire

960 acre Three Rivers Petroglyph site and Mogollon Village.

We are requesting your comments on our proposed opportunities and our site density map, and if you think further consultation is necessary to meet the requirements of 43 CFR 800.4. To further aid in your interpretation of our site map, we are enclosing the base map and mylar overlays for the area. The overlay shows the sites and previous surveys conducted in the area. Please return the base map and overlays to us in a week after you get them.

Sincerely yours,

/s/ Daniel C. B. Rathbun

Daniel C. B. Rathbun
District Manager

Enclosure

STATE OF NEW MEXICO
OFFICE OF CULTURAL AFFAIRS
HISTORIC PRESERVATION DIVISION
VILLA RIVERA, ROOM 101
228 EAST PALACE AVENUE
SANTA FE, NEW MEXICO 87503
(505) 827-8320

TONEY ANAYA
GOVERNOR

JILL Z. COOPER
CULTURAL AFFAIRS OFFICER

THOMAS W. MERLAN
DIRECTOR

May 21, 1984

Mr. Daniel C. B. Rathbun
District Manager
Bureau of Land Management
Las Cruces District Office
Post Office Box 1420
Las Cruces, New Mexico 88004

Dear Mr. Rathbun:

This is in response to your letter of May 4, 1984 which requested comment from this office regarding cultural resource concerns for the Bureau of Land Management's White Sands Resource Management Plan (RMP). These comments are provided as part of the Section 106 review process, as defined in 36 CFR 800.

Your letter included a large-scale regional map which indicated archaeological inventories and known sites in the White Sands Resource Area, and a smaller-scale map identifying areas with high and low expected archaeological site densities. The latter map also identified areas for which there are insufficient environmental or cultural resource data to make a determination of potential archaeological sensitivity. Based on analysis of known data in the resource area, your letter provided eight specific management recommendations for cultural resources for the upcoming RMP.

The majority of BLM's management recommendations include measures for active protection of selected sites which are of known archaeological or historical importance. These recommendations include prohibiting or restricting off-road vehicles (ORV) in the vicinity of the Rattlesnake Hill archaeological district, Alamo Mountain petroglyph site, selected portions of the Jarilla Mountains and Lone Butte. Fencing is proposed for the entire Three Rivers petroglyph site and Mogollon village, and several sites on McGregor Range. National Register nomination and development restriction are proposed for the Alamo Mountain site, and portions of the Butterfield and Jornada del Muerto Trails. As you are probably aware, portions of the Alamo Mountain site (primarily the Alamo Mountain stage stop) were placed on the State Register of Cultural Properties in the late 1960s. Public interest has been expressed to this office regarding the need to have the site placed on the National Register as well.

In my opinion, all of the recommendations included in your letter would provide much-needed protection to those selected resources, and should be implemented by the Bureau in its management of the White Sands Resource Area.

However, in view of the limited cultural resource data available for the resource area, I also recommend that BLM initiate a systematic regional survey for those portions of the resource area which have little or no archaeological data at present, or which have the greatest potential for as-yet-unidentified sites sustaining direct impacts from broad-ranging land uses such as ORV traffic, grazing, and site vandalism. In terms of better defining the regional data base, areas which may particularly benefit from additional sample inventory include Alkali Lakes, eastern Otero County, near the Guadalupe Mountains, and Caballo Mountain, among other areas identified on BLM's archaeological analysis map. As noted in your letter, survey of the Alkali Lakes area would be particularly significant, given the possibility of discovering Paleo-Indian remains in the playa areas.

In terms of longer-term planning and management concerns for the White Sands Resource Area, other actions which may contribute to the preservation and enhancement of cultural resources include further development of a computerized environmental and archaeological data base for the area, an active archaeological site monitoring program to help prevent unauthorized excavation and vandalism, and establishment of cooperative agreements with the State and other resource managing agencies to insure more complete exchange of cultural resource information for the region. For example, the White Sands Missile Range has recently completed a cultural resource overview and management plan which may provide useful comparison with adjacent segments of BLM's White Sands Resource Area. The survey information for the Black Range survey should also be available through the Laboratory of Anthropology, as are the survey data from the University of New Mexico field school in the Palomas Creek area.

Regarding the need for further consultation, I would appreciate further information about BLM's inventory plans for the area. I look forward to reviewing the draft planning document and environmental impact statement. Your maps are being returned under separate cover.

I appreciate your continuing cooperation.

Sincerely,

Thomas W. Merlan
State Historic Preservation Officer

TWM:NEW:jmg

APPENDIX I

ECONOMIC CONDITION

APPENDIX I-1

DEVELOPING RANCH BUDGETS FOR THE WHITE SANDS RESOURCE MANAGEMENT PLAN

The ranch budgets used in the White Sands Resource Management Plan (RMP) were developed using information from BLM case files, aerial photographs, rangeland development inventory files, allotment analysis files, New Mexico State University (NMSU) Departmental Staff Report No. 34, NMSU Agricultural Experiment Station Bulletin 685, consultations with the Range Improvement Task Force Economist, and discussions with BLM specialists familiar with the area. It should be noted that 1982 was not a typical year for livestock operations. According to NMSU Departmental Staff Report No. 34, the 1982 prices operators received for their livestock were generally lower than 1978 levels. The only exception was for wool. Wool prices peaked in 1981 "... but there was a decline in prices in 1982 after most sheep ranchers in southeastern New Mexico sold their wool at prices that were slightly higher than those received in 1981." These lower 1982 prices were still above 1978 levels. Prices paid by ranchers for farm-produced inputs peaked in 1982 except for feed, private land lease fees, and livestock purchases. These inputs reached their highest levels during the 1978-1982 period in 1980 or 1981. Many operators, except for cow-sheep operators, also fed more hay during 1982 than in 1978.

In order to determine how many operations were in the Resource Area, allotments were grouped by operator. These groupings were then verified by BLM Range Conservationists familiar with the operations. Those operations which only had Section 15 permits were excluded from the totals since there was insufficient information to estimate their total herd size.

After total operations were determined, a 5-year average was estimated from grazing bills to determine the average number of animal unit months (AUMs) for each operation. A 5-year average was used since it was determined that this was a good indicator of typical numbers being run on the allotment. The assumption was made that the AUMs for State and private lands as shown in the allotment case files were indicative of typical numbers being run on the allotment. The total herd size for each operation was determined by adding BLM, State, and private AUMs and converting these total AUMs to animal units (AUs). During this process, the operations were categorized according to kind and class of livestock. This involved estimating a 5-year average for sheep and cattle for those allotments which ran both. The operations were then classified by different ranch sizes according to the total number of AUs. The ranges used for the various ranch sizes are as follows: Small Cow-Calf Operation, 1-199 AUs; Medium Cow-Calf Operation, 200-499 AUs; Large Cow-Calf Operation, 500+ AUs; and Medium Cow-Sheep Operation, 200-600 AUs. After the individual operations were placed under their respective ranch sizes, an average AU for each ranch size was calculated by dividing the total number of AUs by the number of operators. The overall dependency on public land was estimated by dividing BLM preference AUMs by the total AUMs (including State and private) available for grazing for all operations.

The ranch budgets for each size operation were estimated by adjusting the 1982 NMSU ranch budgets for southeastern New Mexico published in the NMSU Departmental Staff Report No. 34, Department of Agricultural Economics and Agricultural Business. The adjustments made included estimating the average AU using BLM animal unit equivalent (AUE) methods. After the BLM average AUs were estimated for the NMSU budgets, percentage differences between BLM average AUs and NMSU average AUs (using BLM AUE methods) were calculated. The resulting percentages were then used to adjust specific NMSU ranch budget items for each ranch size. Specific items in the budgets such as the leases and grazing fees and rangeland improvement types and number of units were derived from BLM data. Additional information regarding detailed methodology for each ranch size budget is available in Technical Report V, which is available for review in the White Sands Resource Area Office.

APPENDIX I-1 (continued)

SMALL COMMERCIAL COW-CALF OPERATION[a]
WHITE SANDS RESOURCE AREA (OTERO COUNTY), 1982

1-199 AUs (97 Average AUs) - 34 Operators

Estimated Receipts

Item	Number per Ranch	Average Weight (CWT)[b]	Price per CWT	Value per Head	Receipts
Cash Receipts					
Cattle					
Cows	17	7.80	$36.00		$ 4,773.60
Yearling Steers 1-2	2	6.00	63.00		756.00
Heifer Calves	15	3.48	54.00		2,818.80
Steer Calves	31	3.88	65.00		7,818.20
Bulls	1	13.00	46.00		598.00
Subtotal	66				$16,764.60
Noncash Receipts					
Livestock Inventory Change					
Yearling Heifers 1-2	3			$370.00	1,110.00
Heifer Calves	-4			235.00	-940.00
Steer Calves	-1			245.00	-245.00
Subtotal	-2				$ -75.00
Livestock Perquisites					
Steer Calves	1	3.88	$65.00		$ 252.20
TOTAL RECEIPTS					$16,941.80

SMALL COMMERCIAL COW-CALF OPERATION[a/]
WHITE SANDS RESOURCE AREA (OTERO COUNTY), 1982

1-199 AUs (97 Average AUs) - 34 Operators

Estimated Costs

Item	Unit	Quantity	Purchased Inputs	Fuel and Repairs	Repairs and Maintenance	Depreciation	Total
Feed							
Hay	tons	11.5	$ 977.50				$ 977.50
Grain	CWT	2	11.60				11.60
Grain Cubes, 32%	CWT	573.5	2,781.48				2,781.48
Protein Concentrates, 41%	CWT	19.5	243.75				243.75
Salt and Minerals	CWT	27.5	192.50				192.50
Subtotal			$ 4,206.83				$ 4,206.83
Leases and Grazing Fees							
BLM	AUMs	768	$ 1,428.48				$ 1,428.48
State	acres	1,804	775.72				775.72
Private	acres	746	522.20				522.20
Subtotal			$ 2,726.40				$ 2,726.40
Livestock Expenses							
Veterinary and Medicine	head	117	$ 230.49				$ 230.49
Bulls	head	1	1,500.00				1,500.00
Subtotal			$ 1,730.49				$ 1,730.49
Labor (Hired)							
Daily	days	6	$ 168.00				$ 168.00
Contract Labor	days	2	70.00				70.00
Subtotal			$ 238.00				$ 238.00
Other							
Electricity	ckh	30	$ 293.40				$ 293.40
Telephone	months	12	426.24				426.24
Butane and Heating	gallons	150	135.00				135.00
Insurance	number	1	775.00				775.00
Miscellaneous	head	117	368.55				368.55
Property Tax (Land)	acres	2,286	297.18				297.18
Property Tax (Livestock)	head	117	175.50				175.50
Subtotal			$ 2,470.87				$ 2,470.87
Machinery and Equipment							
Auto (Ranch Share)	miles	5,889.3		$ 918.73		$ 530.04	$ 1,448.77
Pickup	miles	13,857.12		2,258.71		1,316.43	3,575.14
Other Equipment	dollars	2,818				501.60	501.60
Contract Work	dollars	56.6		216.78			216.78
Subtotal				$3,394.22		$2,348.07	$ 5,742.29
Improvements							
House (Ranch Share)	number	1			$ 113.00	$ 475.00	$ 588.00
Service Buildings	number	2			92.00	266.00	358.00
Fences	miles	13.9			443.01	635.37	1,078.38
Corrals	number	1			61.32	116.67	177.99
Wells	number	3			162.00	800.01	962.01
Tanks	number	8			113.20	518.40	631.60
Pipelines	miles	2			61.40	162.00	223.40
Subtotal					$1,045.93	$2,973.45	$ 4,019.38
TOTAL COSTS			$11,372.59	$3,394.22	$1,045.93	$5,321.52	$21,134.26
Returns to Operator Labor, Management, and Capital							$-4,192.46

SMALL COMMERCIAL COW-CALF OPERATION[a]
WHITE SANDS RESOURCE AREA (OTERO COUNTY), 1982

1-199 AUs (97 Average AUs) - 34 Operators

Livestock Inventory

Class	Beginning	Purchased	Born	Sold	Died	Used	End
Cattle							
Cows Beef	70	0	0	17	1	0	70
Heifers 1-2	18	0	0	0	1	0	21
Steers 1-2	0	0	0	2	0	0	0
Heifer Calves	22*	0	33	15	0	0	18*
Steer Calves	2*	0	35	31	2	1	1*
Bulls	5	1	0	1	0	0	5
Total Cattle	117	1	68	66	4	1	115
Cattle AUs	93						96
Horses	2	0	0	0	0	0	2
Horse AUs	2						2
TOTAL AUs	95						98

Average AUs = 97[c]
34 Operators

Source: BLM Las Cruces District Office Files, 1984.

Notes: a/Average herd size 97 cows, 77 percent calf crop based on a percentage of cows and exposed yearling heifers in the breeding herd on Jaunary 1, 18 cows per bull, forage dependency on BLM land in the White Sands Resource Area 71 percent, deeded range 11 percent, State land 18 percent, real estate is valued on an AU basis.
b/CWT = 100 weight.
c/Calculation of average AUs = 95 + 98 ÷ 2 = 96.5 or 97 average AUs.
* Does not count against BLM AUs.

MEDIUM COMMERCIAL COW-CALF OPERATION[a]
WHITE SANDS RESOURCE AREA (OTERO COUNTY), 1982

200-499 AUs (304 Average AUs) - 13 Operators

Estimated Receipts

Item	Number per Ranch	Average Weight (CWT)[b]	Price per CWT	Value per Head	Receipts
Cash Receipts					
Cattle					
Cows	48	8.00	$36.00		$13,824.00
Yearling Heifers 1-2	2	5.80	52.00		603.20
Yearling Steers 1-2	18	6.20	63.00		7,030.80
Heifer Calves	54	3.58	54.00		10,439.28
Steer Calves	95	3.98	65.00		24,576.50
Bulls	4	14.00	46.00		2,576.00
Subtotal	221				$59,049.78
Noncash Receipts					
Livestock Inventory Change					
Cows	-7			$400.00	$-2,800.00
Yearling Heifers 1-2	2			375.00	750.00
Yearling Steers 1-2	-1			395.00	-395.00
Heifer Calves	7			240.00	1,680.00
Steer Calves	-1			250.00	-250.00
Bulls	-2			960.00	-1,920.00
Subtotal	-2				$-2,935.00
Livestock Perquisites					
Yearling Steers 1-2	1	6.20	$63.00		$ 390.60
TOTAL RECEIPTS					$56,505.38

MEDIUM COMMERCIAL COW-CALF OPERATION[a/]
WHITE SANDS RESOURCE AREA (OTERO COUNTY), 1982

200-499 AUs (304 Average AUs) - 13 Operators

Estimated Costs

Item	Unit	Quantity	Purchased Inputs	Fuel and Repairs	Repairs and Maintenance	Depreciation	Total
Feed							
Hay	tons	43	$ 3,663.50				$ 3,663.50
Grain	CWT	12	71.34				71.34
Grain Cubes, 32%	CWT	2,061	9,996.34				9,996.34
Protein Concentrates, 41%	CWT	261	3,266.25				3,266.25
Salt and Minerals	CWT	86	602.70				602.70
Subtotal			$17,600.13				$17,600.13
Leases and Grazing Fees							
BLM	AUMs	2,342	$ 4,356.12				$ 4,356.12
State	acres	5,224	2,246.32				2,246.32
Subtotal			$ 6,602.44				$ 6,602.44
Livestock Expenses							
Veterinary and Medicine	head	371	$ 786.52				$ 786.52
Bulls	head	2	3,000.00				3,000.00
Subtotal			$ 3,786.52				$ 3,786.52
Labor (Hired)							
Monthly	months	2	$ 1,000.00				$ 1,000.00
Daily	days	5	140.00				140.00
Contract Labor	days	10	350.00				350.00
Subtotal			$ 1,490.00				$ 1,490.00
Other							
Electricity	ckh	50	$ 489.00				$ 489.00
Telephone	months	12	468.00				468.00
Butane and Heating	gallons	200	180.00				180.00
Insurance	number	1	1,384.00				1,384.00
Miscellaneous	head	371	2,626.68				2,626.68
Property Tax (Land)	acres	6,150	676.50				676.50
Property Tax (Livestock)	head	371	352.45				352.45
Subtotal			$ 6,176.63				$ 6,176.63
Machinery and Equipment							
Auto (Ranch Share)	miles	11,070		$1,660.50		$ 1,051.65	$ 2,712.15
Pickup	miles	24,600		3,444.00		2,460.00	5,904.00
Other Equipment	dollars	6,150				1,094.70	1,094.70
Subtotal				$5,104.50		$ 4,606.35	$ 9,710.85
Improvements							
House (Ranch Share)	number	1			$ 158.00	$ 557.50	$ 715.50
Service Buildings	number	2			116.00	285.00	401.00
Fences	miles	28			1,195.60	1,439.76	2,635.36
Corrals	number	6			438.00	960.00	1,398.00
Wells	number	5			440.00	1,500.00	1,940.00
Tanks	number	12			252.00	960.00	1,212.00
Pipelines	miles	7			241.50	700.00	941.50
Subtotal					$2,841.10	$ 6,402.26	$ 9,243.36
TOTAL COSTS			$35,655.72	$5,104.50	$2,841.10	$11,008.61	$54,609.93
Returns to Operator Labor, Management, and Capital							$ 1,895.45

MEDIUM COMMERCIAL COW-CALF OPERATION[a]
WHITE SANDS RESOURCE AREA (OTERO COUNTY), 1982

200-499 AUs (304 Average AUs) - 13 Operators

Livestock Inventory

Class	Beginning	Purchased	Born	Sold	Died	Used	End
Cattle							
Cows Beef	241	0	0	48	2	0	234
Heifers 1-2	43	0	0	2	3	0	45
Steers 1-2	5	0	0	18	0	1	4
Heifer Calves	50*	0	112	54	1	0	57*
Steer Calves	18*	0	116	95	4	0	17*
Bulls	14	2	0	4	0	0	12
Total Cattle	371	2	228	221	10	1	369
Cattle AUs	303						295
Horses	5	0	0	0	0	0	5
Horse AUs	5						5
TOTAL AUs	308						300

Average AUs = 304[c]
13 Operators

Source:

Notes: a/Average herd size 304 cows, 80 percent calf crop based on a percentage of cows and exposed yearling heifers in the breeding herd on Jaunary 1, 20 cows per bull, forage dependency on BLM land in the White Sands Resource Area 71 percent, deeded range 13 percent, State land 16 percent, real estate is valued on an AU basis.
b/CWT = 100 weight.
c/Calculation of average AUs = 308 + 300 ÷ 2 = 304 average AUs.
* Does not count against BLM AUs.

LARGE COMMERCIAL COW-CALF OPERATION[a]
WHITE SANDS RESOURCE AREA (OTERO COUNTY), 1982

500+ AUs (1,079 Average AUs) - 5 Operators

Estimated Receipts

Item	Number per Ranch	Average Weight (CWT)[b]	Price per CWT	Value per Head	Receipts
Cash Receipts					
Cattle					
Cows	221	8.20	$30.00		$ 54,366.00
Yearling Heifers 1-2	30	6.00	54.50		9,810.00
Yearling Steers 1-2	302	6.40	64.50		124,665.60
Heifer Calves	155	4.00	57.00		35,340.00
Steer Calves	131	4.25	67.00		37,302.25
Bulls	8	12.00	45.00		4,320.00
Subtotal	847				$265,803.85
Noncash Receipts					
Livestock Inventory Change					
Cows	-40			$415.00	$-16,600.00
Yearling Heifers 1-2	31			370.00	11,470.00
Heifer Calves	-13			215.00	-2,795.00
Steer Calves	-31			248.00	-7,688.00
Bulls	-2			855.00	-1,710.00
Subtotal	-55				$-17,323.00
Livestock Perquisites					
Heifer Calves	4	4.00	$57.00		$ 912.00
Steer Calves	1	4.25	67.00		284.75
Subtotal	5				$ 1,196.75
TOTAL RECEIPTS					$249,677.60

LARGE COMMERCIAL COW-CALF OPERATION[a/]
WHITE SANDS RESOURCE AREA (OTERO COUNTY), 1982

500+ AUs (1,079 Average AUs) - 5 Operators

Estimated Costs

Item	Unit	Quantity	Purchased Inputs	Fuel and Repairs	Repairs and Maintenance	Depreciation	Total
Feed							
Hay	tons	29.5	$ 2,583.64				$ 2,583.64
Grain	CWT	87	526.70				526.70
Grain Cubes, 32%	CWT	7,377.3	51,672.73				51,672.73
Protein Concentrates, 41%	CWT	190.9	2,388.24				2,388.24
Salt and Minerals	CWT	438.6	2,831.03				2,831.03
Subtotal			$ 60,002.34				$ 60,002.34
Leases and Grazing Fees							
BLM	AUMs	8,146	$ 15,150.82				$ 15,150.82
State	acres	19,764	5,929.20				5,929.20
Subtotal			$ 21,080.02				$ 21,080.02
Livestock Expenses							
Veterinary and Medicine	head	1,624	$ 3,865.12				$ 3,865.12
Steer Calves	head	15	4,140.00				4,140.00
Heifer Calves	head	18	4,194.00				4,194.00
Bulls	head	6	7,200.00				7,200.00
Subtotal			$ 19,399.12				$ 19,399.12
Labor (Hired)							
Annual	months	26	$ 15,600.00				$ 15,600.00
Other							
Electricity	ckh	340	$ 3,267.40				$ 3,267.40
Telephone	months	12	1,242.00				1,242.00
Butane and Heating	gallons	1,500	1,470.00				1,470.00
Insurance	number	1	5,035.00				5,035.00
Miscellaneous	head	1,623	7,243.04				7,243.04
Property Tax (Land)	acres	9,795	2,252.94				2,252.94
Property Tax (Livestock)	head	1,623	828.24				828.24
Subtotal			$ 21,338.62				$ 21,338.62
Machinery and Equipment							
Auto (Ranch Share)	miles	10,234		$ 1,432.76		$ 614.04	$ 2,046.80
Pickup	miles	54,825		10,416.75		3,837.75	14,254.50
Trucks	miles	5,848		2,865.52		818.72	3,684.24
Tractors	hours	219		840.96		477.42	1,318.38
Other Equipment	dollars	10,234				1,739.78	1,739.78
Subtotal				$15,555.99		$ 7,487.71	$ 23,043.70
Improvements							
House (Ranch Share)	number	3			$ 586.05	$ 1,927.80	$ 2,513.85
Service Buildings	number	3			543.15	1,121.31	1,664.46
Fences	miles	102			3,145.68	6,033.30	9,178.98
Corrals	number	5			273.15	1,363.90	1,637.05
Wells	number	7			518.56	2,216.20	2,734.76
Tanks	number	30			828.60	3,724.50	4,553.10
Pipelines	miles	21			291.48	1,166.34	1,457.82
Subtotal					$6,186.67	$17,553.35	$ 23,740.02
TOTAL COSTS			$137,420.10	$15,555.99	$6,186.67	$25,041.06	$184,203.82
Returns to Operator Labor, Management, and Capital							$ 65,473.78

LARGE COMMERCIAL COW-CALF OPERATION[a/]
WHITE SANDS RESOURCE AREA (OTERO COUNTY), 1982

500+ AUs (1,079 Average AUs) - 5 Operators

Livestock Inventory

Class	Beginning	Purchased	Born	Sold	Died	Used	End
Cattle							
Cows Beef	797	0	0	221	7	0	757
Heifers 1-2	188	0	0	30	4	0	219
Steers 1-2	29	0	0	302	0	0	29
Heifer Calves	253*	18	395	155	14	4	240*
Steer Calves	302*	15	412	131	24	1	271*
Bulls	55	6	0	8	0	0	53
Total Cattle	1,624	39	807	847	49	5	1,569
Cattle AUs	1,069						1,058
Horses	16	0	0	0	1	0	15
Horse AUs	16						15
TOTAL AUs	1,085						1,073

Average AUs = 1,079[c/]
5 Operators

Source: BLM Las Cruces District Office Files, 1984.

Notes: a/Average herd size 1,079 cows, 82 percent calf crop based on a percentage of cows and exposed yearling heifers in the breeding herd on Jaunary 1, 18 cows per bull, forage dependency on BLM land in the White Sands Resource Area 67 percent, deeded range 10 percent, State land 23 percent, real estate is valued on an AU basis.

b/CWT = 100 weight.

c/Calculation of average AUs = 1,085 + 1,073 ÷ 2 = 1,079 average AUs.

* Does not count against BLM AUs.

MEDIUM COMMERCIAL COW-SHEEP OPERATION[a]
WHITE SANDS RESOURCE AREA (OTERO COUNTY), 1982

200-600 AUs (520 Average AUs) - 8 Operators

Estimated Receipts

Item	Number per Ranch	Average Weight (CWT)[b]	Price per CWT	Value per Head	Receipts
Cash Receipts					
Sheep					
Ewes, Aged	146	1.20	$ 12.00		$ 2,102.40
Ewes, Young	45	1.32	12.00		712.80
Lambs	859	0.77	47.00		31,087.21
Wethers	5	1.20	15.00		90.00
Bucks	3	1.40	15.00		63.00
Subtotal	1,058				$ 34,055.41
Wool	1,810	0.106	$105.00		$ 20,145.30
Wool Incentive Payments					
Wool	1,810	0.106	$105.30		$ 20,202.86
Lambs	859	0.770	3.92		2,592.81
Subtotal	2,669				$ 22,795.67
Cattle					
Cows	20	9.00	$ 36.00		$ 6,480.00
Yearling Heifers 1-2	4	6.20	52.00		1,289.60
Yearling Steers 1-2	3	6.50	63.00		1,228.50
Heifer Calves	28	4.15	54.00		6,274.80
Steer Calves	47	4.30	65.00		13,136.50
Bulls	1	13.00	46.00		598.00
Subtotal	103				$ 29,007.40
Noncash Receipts					
Livestock Inventory Change					
Ewes, Aged	25			$ 16.00	$ 400.00
Ewes, Young	10			45.00	450.00
Ewes, Yearling	14			45.00	630.00
Lambs	54			30.00	1,620.00
Wethers	4			90.00	360.00
Bucks	1			50.00	50.00
Cows	-4			400.00	-1,600.00
Yearling Heifers 1-2	-1			370.00	-370.00
Heifer Calves	-1			240.00	-240.00
Subtotal	102				$ 1,300.00
Livestock Perquisites					
Lambs	2	.77	$47.00		$ 72.38
Wethers	4	1.20	15.00		72.00
Steer Calves	1	4.30	65.00		279.50
Subtotal	7				$ 423.88
TOTAL RECEIPTS					$107,727.66

MEDIUM COMMERCIAL COW-SHEEP OPERATION[a/]
WHITE SANDS RESOURCE AREA (OTERO COUNTY), 1982

200-600 AUs (520 Average AUs) - 8 Operators

Estimated Costs

Item	Unit	Quantity	Purchased Inputs	Fuel and Repairs	Repairs and Maintenance	Depreciation	Total
Feed							
Hay	tons	9	$ 801.00				$ 801.00
Grain	CWT	45	222.50				222.50
Grain Cubes, 32%	CWT	487	4,142.05				4,142.05
Salt and Minerals	CWT	244	1,461.60				1,461.60
Subtotal			$ 6,627.15				$ 6,627.15
Leases and Grazing Fees							
BLM	AUMs	3,780	$ 7,030.80				$ 7,030.80
State	acres	6,068	2,123.80				2,123.80
Subtotal			$ 9,154.60				$ 9,154.60
Livestock Expense							
Veterinary and Medicine	head	1,825	$ 2,007.50				$ 2,007.50
Bulls	head	1	1,200.00				1,200.00
Bucks	head	6	600.00				600.00
Subtotal			$ 3,807.50				$ 3,807.50
Labor (Hired)							
Annual	months	11	$ 7,700.00				$ 7,700.00
Monthly	months	5	2,500.00				2,500.00
Shearing	head	1,825	2,737.50				2,737.50
Subtotal			$12,937.50				$12,937.50
Other							
Electricity	ckh	150	$ 1,467.00				$ 1,467.00
Telephone	months	12	585.12				585.12
Butane and Heating	gallons	450	405.00				405.00
Insurance	number	1	3,204.00				3,204.00
Miscellaneous	head	1,825	3,266.75				3,266.75
Property Tax (Land)	acres	6,372	828.36				828.36
Property Tax (Livestock)	head	1,825	492.75				492.75
Subtotal			$10,248.98				$10,248.98
Machinery and Equipment							
Pickup	miles	26,700		$3,471.00		$ 1,602.00	$ 5,073.00
Trucks	miles	1,335		387.15		574.05	961.20
Tractors	hours	223		553.04		120.42	673.46
Other Equipment	dollars	4,806				865.08	865.08
Subtotal				$4,411.19		$ 3,161.55	$ 7,572.74
Improvements							
House (Ranch Share)	number	3			$ 297.00	$ 2,457.00	$ 2,754.00
Service Buildings	number	4			260.00	1,100.00	1,360.00
Fences	miles	59			2,249.67	8,260.00	10,509.67
Corrals	number	3			250.20	384.99	635.19
Wells	number	3			261.00	1,200.00	1,461.00
Tanks	number	26			717.60	2,600.00	3,317.60
Pipelines	miles	16			707.20	2,000.00	2,707.20
Subtotal					$4,742.67	$18,001.99	$22,744.66
TOTAL COSTS			$42,775.73	$4,411.19	$4,742.67	$21,163.54	$73,093.13
Returns to Operator Labor, Management, and Capital							$34,634.53

MEDIUM COMMERCIAL COW-SHEEP OPERATION
WHITE SANDS RESOURCE AREA (OTERO COUNTY), 1982

200-600 AUs (520 Average AUs) - 8 Operators

Livestock Inventory

Class	Beginning	Purchased	Born	Sold	Died	Used	End
Sheep							
Ewes, Aged	91	0	0	146	18	0	116
Ewes, Young	1,129	0	0	45	5	0	1,139
Ewes, Yearling	249	11	0	0	2	0	263
Lambs	267	0	1,219	859	37	2	321
Wethers	9	0	0	5	0	4	13
Bucks	80	6	0	3	2	0	81
Total Sheep	1,825	17	1,219	1,058	64	6	1,933
Sheep AUs	365						387
Cattle							
Cows Beef	107	0	0	20	2	0	103
Heifers 1-2	18	0	0	4	1	0	17
Steers 1-2	4	0	0	3	0	0	4
Heifer Calves	22*	0	50	28	1	0	21*
Steer Calves	3*	0	53	47	2	1	3*
Bulls	6	1	0	1	0	0	6
Total Cattle	160	1	103	103	6	1	154
Cattle AUs	135						130
Horses	11	0	0	0	0	0	11
Horse AUs	11						11
TOTAL AUs	511						528

Average AUs = 520c/
8 Operators

Source: BLM Las Cruces District Office Files, 1984.

Notes: a/Average herd size 1,879 sheep, 133 cows, 11 horses, 83 percent lamb crop based on a percentage of numbers of ewes exposed, 82 percent calf crop based on a percentage of cows and exposed yearling heifers in the breeding herd on Jaunary 1, forage dependency on BLM land in the White Sands Resource Area 62 percent, deeded range 16 percent, State land 22 percent, real estate is valued on an AU basis.
b/CWT = 100 weight.
c/Calculation of average AUs = 511 + 528 ÷ 2 = 519.5 or 520 average AUs.
* Does not count against BLM AUs.

APPENDIX I-2

RANCH BUDGET LINEAR PROGRAMMING MODEL

A linear programming model was used to estimate the economic impacts typical ranching operations would experience due to BLM AUM adjustments under each alternative. The linear programming model is an algorithm that solves for an optimum solution given a set of constraints. These constraints are: animal requirements constraint, labor constraint, production constraints, grazing forage constraints, and production input constraints. The animal requirements constraint assumes the grazing forage and hay consumed by the herd equals the feed requirements for the herd. The labor constraint utilized equals livestock and hay labor. The production constraints assume livestock produced equals livestock sold (herd size remains constant) and the hay produced or purchased equals hay utilized. The grazing forage constraint must be less than or equal to the grazing available from each forage source. The production input constraints assume total labor hours utilized must be less than or equal to total labor hours available.

A simplified description of the ranch budget linear programming analysis is that each program run begins with a given number of livestock, selects the cheapest forage available, adds the costs of supporting the livestock for a year, and compares the total cost against the revenue gained from the sale of the livestock. If the revenue is positive, the program continues by adding additional livestock and repeating the process. Whenever the total yearly costs exceed the sales revenue, that program run is rejected. The program keeps track of the amount of forage used in each category each month (or season), and when the maximum available level in a category is reached, only forage from other categories enters into the solution. The model provides information on the change in the herd size and the requirements for inputs, such as labor, in addition to information on dollar gains or losses. Any change in production requirements means a change in the economic activity of the community as the rancher purchases more/less labor and other production inputs to run the ranching operation.

The computer program calculated the feed requirements for the entire herd based on the following assumptions:

1. Birth occurs in the middle of the month.

2. Sales occur at the end of the month (i.e., October 31).

3. Calves (for feed calculation purposes) are older than 6 months but younger than 12 months.

4. Yearlings are older than 11 months but younger than 2 years.

5. All yearlings except replacement heifers are sold.

6. Animals that die are assumed fed for the entire period (i.e., death loss occurs at the end of the period).

7. All sales occur by order of birth--oldest sold first.

The previous assumptions that are necessary to mathematically solve the linear programming problem are obviously not correct when applied to the actual ranch operation. Hence, the assumptions limit the applicability of the linear programming analysis to the ranch problem. It is unlikely that the income and production functions are strictly linear; if the ranch size doubles, some economies/diseconomies of scale will occur. The solution is only accurate in a limited size range and the model's structure or coefficients must be changed when the size range is exceeded. Since biological inputs are not divisible, the solution must be treated as an approximation.

Information from each individual ranch size budget was used to develop computer data files. The purpose of this process was to input baseline ranch budget data into the computer program to estimate impacts. The method used to estimate impacts to the ranch operators involved estimating the average AUMs by alternatives for each ranch size. Once this was accomplished, the forage requirement was adjusted by the amount of AUMs available for the alternative. The linear programming model calculated the total returns above variable costs. The returns to operator labor, management, and capital were estimated by subtracting fixed costs and depreciation costs from the returns above variable costs. It should be noted the results are merely estimates used for analysis purposes. The detailed calculations used to develop data files for each ranch size category for each alternative are contained in Technical Report V, which is available for review in the White Sands Resource Area Office.

APPENDIX I-3

REGIONAL ANALYSIS METHODOLOGY

The White Sands Resource Area economy, which covers Otero and Sierra Counties for this document, was analyzed using the U.S. Forest Service-developed computer-based system referred to as IMPLAN. The IMPLAN system utilizes input-output analysis procedures and provides the analyst the flexibility to develop nonsurvey-based interindustry models to perform regional analysis on one or several counties. Since the Rangeland Management Issue in this document was for Otero County only, a separate model was built for Otero County to analyze the impacts and compare the results against the Otero-Sierra regional analysis results. The results indicated no significant differences between the two models. (See Technical Report V for additional information.)

The IMPLAN data base consists of two primary components; a National-level technology matrix and estimates of sectoral activity for final demand, final payments, gross output, and employment for each county. The data represent 1977 county-level economic activity for 466 sectors. The National-level technology matrix is used to estimate local purchases and sales. Regional purchase patterns are estimated using production functions from this matrix which depict National average sectoral input and output technology. The estimates of sectoral activity for final demand, final payments, gross output, and production employment for all states and every county within each state use total National activity; the data are then disaggregated to state and county levels with the 1977 National Income and Products Accounts information used as control totals applied at each level. Since there are some states and counties that do not have comparable accounts, the most suitable measure of economic activity within that particular region was used to disaggregate National production and demand activity. The disaggregation was first done for the state and then the state data were disaggregated down to the county level.

Gross output and employment estimates utilized several sources. Agricultural sector activity was estimated using the U.S. Department of Commerce, Census of Agriculture, 1977, and the U.S. Department of Agriculture, Agricultural Statistics, 1979. The gross output measures for most of the other sectors utilized data from the County Business Patterns, Dun and Bradstreet Corporation, Census of Housing, and the Census of Governments. (See Technical Report V for additional information.)

General methodology used to analyze the Rangeland Management Issue consisted of building expenditure and data files. Information for these files was taken from the ranch budgets constructed for Otero County for this document, and proposed rangeland improvement data for each alternative. The impacts the regional economy would experience due to the change in each alternative were analyzed using the following method. Gross receipts for all operators who use BLM land were estimated from the ranch budgets. These gross receipts were then divided by the total number of animal unit months (AUMs) used by the operators to determine the value of these gross receipts per AUM. The value of the gross receipts per AUM were deflated from 1982 dollars to 1977 dollars to be consistent with the IMPLAN data base, using

the Bureau of Labor Statistics deflator for the meat animals and miscellaneous livestock sector. The meat animals and miscellaneous livestock sector was used as the primary sector affected under this issue. There are inherent problems with using this sector since it does not disaggregate the production of only BLM operators but rather the production of all operators who fall under this sector for the region (Otero-Sierra region or Otero region). Therefore, it should be understood that the results for this sector may be somewhat underestimated. In order to make a fairly accurate estimation of the direct impact to BLM operators, results from the linear analysis were used and supplemented with the IMPLAN results from the meat animals and miscellaneous livestock sector. The IMPLAN data base was used to primarily estimate the overall economic effect on the Resource Area economy. The impact analysis was based on the change in AUMs for each alternative and the gross receipts value per AUM. This data was used as input to the IMPACT program of IMPLAN which estimates the different levels of employment, employee compensation, final demand, total gross output, property income, total income, and value added for the regional model for each alternative. The results of the model were then converted from 1977 dollars to 1982 dollars.

In order to estimate the economic impacts the proposed rangeland improvements had on the economy, total expenditures for all rangeland improvements (including vegetation treatments) were categorized as either "salaries" or "all other expenditures." Since the Federal Government sector is included as a component of final demand, the BLM expenditures were disaggregated to specific sectors to enable the model to estimate purchases made by the Federal Government. Salary expenditures were disaggregated by estimating employee spending patterns. This was accomplished by utilizing information from IMPLAN-generated reports called "Scale/Lister" and "Region." The personal consumption column of the "Scale/Lister" report is divided by the intermediate outlay value from the personal consumption column from the "Region" report. The percentage represents the proportion of the total salary which directly impacts each sector. These percentages were then used as inputs to the IMPACT program of IMPLAN which multiplies the percentages for each sector by the total salary expenditure. The salary expenditures are input separately after being adjusted to 1977 dollars and calculation of the total direct impact is handled within the IMPACT program.

The distribution of nonsalary expenditures is handled in a similar manner as the salary expenditures. The Federal Government Expenditures (FGE) column on the "Scale/Lister" report is used instead of the personal consumptions column. Information from the FGE column excluding expenditures for National defense and negative values are then divided by the intermediate outlay value from the Federal Government column on the "Region" report. The resulting percentages represent the proportion of total nonsalary expenditures which directly impact each sector in the Resource Area economy. These percentages are then used as input to the IMPACT program of IMPLAN. Total nonsalary expenditures were input separately after being adjusted to 1977 dollars.

Once the IMPACT program of IMPLAN calculates the total direct impacts of proposed rangeland improvements (including vegetation treatments), the results are converted into 1982 dollars and presented in the document. (For additional information, see Technical Report V which is available for review in the White Sands Resource Area Office.)

APPENDIX I-4

LAND TENURE ADJUSTMENT ANALYSIS METHODOLOGY

Since the Land Tenure Adjustment Issue involved several types of disposal ranging from land sales to exchange, several basic assumptions were used in the analysis. In order to give some indication of the probable economic impacts, a worst-case analysis was used. This assumed that all isolated and difficult-to-manage parcels, as well as those lands that have been identified for community expansion or where an interest has been shown would be sold at fair market value. The second assumption was in determining what the fair market value would be. Since the appraised value of each tract would vary depending on the location, access, utilities, size of the tract, highest and best use of the land, and the myriad of possibilities of the use of the land, an average per-acre figure was extremely difficult to determine. Typical Statewide values ranged from $50 per acre for those tracts which had no legal access and grazing was the highest and best use of the land, to $2,000 per acre for those tracts which had access, utilities, water, and the highest and best use was for homesites or commercial development. These are typical values and are not to be construed as actual values. Actual appraised values would be determined by site-specific appraisals in the future.

In order to perform an economic analysis of probable impacts, a worst-case value of $100 per acre was assumed. This was used to indicate what economic impacts could occur on the lower end of the estimated fair market value.

After the estimated worst-case fair market value was determined, the estimated assessed valuation and potential tax revenue was estimated. The 1983-1984 mill rates for Otero and Sierra Counties were averaged to determine an average mill rate for the Resource Area economy. Using the above information, the following table was constructed.

LAND TENURE ADJUSTMENT ISSUE

Alternative	Acres Considered for Analysis	Estimated Value	Estimated Assessed Valuation 33 1/3%	Estimated Potential Tax Revenue[a/]
No Action	100	$ 10,000	$ 3,333	$ 53.40
Balanced	45,000	4,500,000	1,499,850	24,031
Production	58,000	5,800,000	1,933,333	30,971
Protection	154,000	15,400,000	5,132,820	82,238

Source: BLM Las Cruces District Office Files, 1984.

Note: a/White Sands Resource Area economy average mill rate of $16.022.

The analysis indicated that Otero and Sierra Counties would not experience an offset of payment in lieu of taxes. This is due largely to the fact that each county's funding limitation is based on population and not acreage.

APPENDIX J

SOILS

APPENDIX J

PACIFIC SOUTHWEST INTERAGENCY COMMITTEE (PSIAC) METHODOLOGY FOR CALCULATING SEDIMENT YIELD

The PSIAC method can be used to estimate annual sediment yield of large areas and is flexible enough to objectively analyze areas ranging from less than an acre to greater than 10 square miles in size. The ability of the user to properly rate the nine factors of the method is its strength, as there is flexibility to adjust with the introduction of additional information. Previous studies indicate that PSIAC correlates with measured yields. By definition, the method develops an estimate of a relative range of values whereby one can objectively compare areas, treatments, or expected magnitude of change over areas that range greatly in size. Expressing the values in specific units does not detract from the usefulness of the results, and provides some measure of the physical meaning of the numbers, even if approximate. An alternative methodology such as the Universal Soil Loss Equation was designed for developed areas, and has not been adapted and checked for use in vast areas of natural lands. It requires a sediment transport and channel erosion model to arrive at sediment production. A large number of small study areas would be required to develop estimates; these would be very time consuming for an area as large as the Resource Area.

The following tables are the PSIAC Sediment Yield Factor Rating Form (Form 7310-16) and additional information on rating each of the factors.

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SEDIMENT YIELD FACTOR RATING

SURFACE GEOLOGY (a)	SOILS (b)	CLIMATE (c)	RUNOFF (d)	TOPOGRAPHY (e)
(10) a. Marine shales and related mudstones and siltstones	(10) a. Fine textured; easily dispersed; saline-alkaline; high shrink-swell characteristics b. Single grain silts and fine sands	(10) a. Storms of several days' duration with short periods of intense rainfall b. Frequent intense convective storms c. Freeze-thaw occurrence	(10) a. High peak flows per unit area b. Large volume of flow per unit area	(20) a. Steep upland slopes (in excess of 30%) b. High relief; little or no floodplain development
(5) a. Rocks of medium hardness b. Moderately weathered c. Moderately fractured	(5) a. Medium textured soil b. Occasional rock fragments c. Caliche layers	(5) a. Storms of moderate duration and intensity b. Infrequent convective storms	(5) a. Moderate peak flows per unit area b. Moderate volume of flow per unit area	(10) a. Moderate upland slopes (less than 20%) b. Moderate fan or floodplain development
(0) a. Massive, hard formations	(0) a. High percentage of rock fragments b. Aggregated clays c. High in organic matter	(0) a. Humid climate with rainfall of low intensity b. Precipitation in form of snow c. Arid climate, low intensity storms d. Arid climate; rare convective storms	(0) a. Low peak flows per unit area b. Low volume of runoff per unit area c. Rare runoff events	(0) a. Gentle upland slopes (less than 5%) b. Extensive alluvial plains
Factor value				

GROUND COVER (f)	LAND USE (g)	UPLAND EROSION (h)	CHANNEL EROSION AND SEDIMENT TRANSPORT (i)
(10) Ground cover does not exceed 20% a. Vegetation sparse; little or no litter b. No rock in surface soil	(10) a. More than 50% cultivated b. Almost all of area intensively grazed c. All of area recently burned	(25) a. More than 50% of the area characterized by rill and gully or landslide erosion	(25) a. Eroding banks continuously or at frequent intervals with large depths and long flow duration b. Active headcuts and degradation in tributary channels
(0) Cover not exceeding 40% a. Noticeable litter b. If trees present understory not well developed	(0) a. Less than 25% cultivated b. 50% or less recently logged c. Less than 50% intensively grazed d. Ordinary road and other construction	(10) a. About 25% of the area characterized by rill and gully or landslide erosion b. Wind erosion with deposition in stream channels	(10) a. Moderate flow depths, medium flow duration with occasionally eroding banks or bed
(−10) a. Area completely protected by vegetation, rock fragments, litter b. Little opportunity for rainfall to reach erodible material	(−10) a. No cultivation b. No recent logging c. Low intensity grazing	(0) a. No apparent signs of erosion	(0) a. Wide shallow channels with flat gradients and short flow duration b. Channels in massive rock, large boulders, or well vegetated c. Artificially controlled channels
Factor value			

	Subtotal (a) – (g)	Subtotal (h) – (i)	TOTAL RATING – – – = – –. – ac.ft./sq. mi./yr.

(Instructions on reverse)

Form 7310–16 (July 1971)

APPENDIX J (continued)

EXAMPLES OF HIGH AND LOW FACTORS OF THE PSIAC METHOD

Factor	Rating Range	Main Characteristics Considered	High Value	Low Value
Surface Geology	0--10	Rock Type Hardness Weathering Fracturing	Soft Fissile Shale	Thick Basalt Flow
Soils	0--10	Texture Aggregation Shrink/Swell Organic Matter Rockiness Salinity Caliche	Nonaggregated Silty Clays	Loamy Sand
Climate	0--10	Storm Frequency, Intensity, Duration Snow Freeze/Thaw	Frequent Intense Storms	50% Snow Precipitation
Runoff	0--10	Volume Per Unit Area Peak Flow Per Unit Area	August Peak Flow	April Peak Flow
Topography	0--20	Steepness of Slopes Relief Fan and Floodplain Development	30% Slopes	5% Slopes
Ground Cover	-10--10	Vegetation Rocks Litter	30% Total Ground Cover	70% Total Ground Cover
Land Use (Grazing)	-10--10	Grazing Intensity Percentage Cultivated	60% Utilization	20% Utilization

APPENDIX J (concluded)

EXAMPLES OF HIGH AND LOW FACTORS OF THE PSIAC METHOD

Factor	Rating Range	Main Characteristics Considered	High Value	Low Value
Upland Erosion	0--25	Rills, Gullies, Arroyos, Landslides Wind Deposits in Channels	50% Gullies, Rills, Arroyos	No Visible Flow Patterns
Channel Erosion and Sediment Transport	0--25	Bank and Bed Erosion Flow Depths Active Headcuts Vegetation in Channels	Active Headcuts and Eroding Banks	Flat Gradients and Wide Channels

Source: Pacific Southwest Interagency Committee, 1972.

APPENDIX K

LIST OF TECHNICAL REPORTS

APPENDIX K

TECHNICAL REPORTS

[Technical Reports are available for review at the Las Cruces District Office.]

I. ACEC MANAGEMENT PLAN

Sacramento Escarpment Scenic Area

II. PREVIOUS LAND USE PLAN DECISIONS/DECISION RECORDS

Southern Rio Grande Management Framework Plan

Southern Rio Grande Rangeland Program Summary

Mesa Management Framework Plan

McGregor Rangeland Management Program Document

Minerals Decisions
- White Sands Oil and Gas Decision Record
- Mineral Material Disposal Decision Record
- Lands Withdrawn from Mineral Entry
- Areas of Critical Mineral Potential

III. VEGETATION

Utilization Criteria for Important Forage Species

Phenology of Important Forage Species in the White Sands Resource Area

U.S. Department of Agriculture Compilation of Registered Use of Herbicides

IV. LIVESTOCK GRAZING

Present and Proposed Forage Use by Land Ownership

V. ECONOMIC CONDITIONS

Detailed Methodology for Developing the Ranch Budgets for Each Ranch Size Category

Regional Analysis Using U.S. Forest Service IMPLAN Model

Detailed Methodology for Linear Analysis

GLOSSARY

GLOSSARY

ACID. (Rocks) A term applied to igneous rocks having a higher percentage of silica than orthoclase (feldspar), the limiting figure commonly adopted being 66 percent.

ACRE-FOOT. The amount of water that will cover one acre of land to a depth of one foot (325,851 gallons or 43,560 cubic feet).

ACTIVITY PLAN. Site-specific plan which precedes actual development. The most detailed level of BLM planning.

ADJUSTMENTS IN NUMBERS. Change (increase or decrease) of livestock numbers to conform to the amount of forage produced in an area considering other multiple uses.

AGGREGATE. Sand, uncrushed or crushed gravel, or crushed stone or rock used as the major constituent in concrete.

ALLOTMENT. An area of land designated and managed for grazing of livestock.

ALLOTMENT MANAGEMENT PLAN (AMP). A documented program which applies to rangeland operations on public land, which is prepared in consultation with the permittee(s) or lessee(s) involved, and which: (1) prescribes the manner in and extent to which livestock operations will be conducted in order to meet the multiple-use, sustained-yield, economic, and other needs and objectives as determined for public land through land use planning; (2) describes the type, location, ownership, and general specifications for the rangeland developments to be installed and maintained on public land to meet the livestock grazing and other objectives of land management; and (3) contains such other provisions relating to livestock grazing and other objectives as may be prescribed by the authorized officer consistent with applicable law.

ALLOWABLE USE FACTOR (AUF). Represents the average weight percentage of a particular plant species that can be safely grazed without restricting future forage capacity production.

ALLUVIAL. Pertaining to material that is transported and deposited by running water.

ALLUVIAL FAN. A fan-shaped accumulation of disintegrated soil material; water deposited and located in a position where the water departs from a steep course to enter upon a flat plain or open valley bottom.

GLOSSARY

ALLUVIUM. Material, including clay, silt, sand, gravel, or similar unconsolidated sediments, deposited by a stream or other body of running water.

ANIMAL UNIT (AU). Considered to be one mature cow (1,000 pounds) or its equivalent based upon average daily forage consumption of 26 pounds of dry matter per day.

ANIMAL UNIT MONTH (AUM). The amount of food or forage required by an animal unit for one month.

ANNUAL PLANT SPECIES. A plant that completes its life cycle and dies in 1 year or less.

APPARENT TREND. The direction of change in rangeland condition over time.

AQUIFER. A geologic formation that contains sufficient saturated permeable material to yield a usable quantity of water to wells or springs.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). Areas within the public land where special management attention is needed to protect and prevent irreparable damage to important historical, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards.

ARIDIC MOISTURE REGIME. (Soils) Soils in which the moisture control section in most years is dry in all parts more than half the time when soil temperature at a depth of 50 centimeters (cm) (approximately 20 inches) is above 5°C and never moist in some or all parts for as long as 90 consecutive days when soil temperature at a depth of 50 cm is above 8°C.

ASPECT SPECIES. A vegetative species that appears to be dominant in the landscape, although it may be only a small percent of the total vegetative composition.

BANK STORAGE. Water absorbed and stored in the banks of a stream or reservoir when the stage rises above the water table in the bank formations.

BASE WATER. Water that is suitable for consumption by livestock and is available and accessible to authorized livestock on public land used for livestock grazing. Grazing preference is tied to control of base waters.

BASIN-AND-RANGE. Topography characterized by a series of tilted fault block mountain ranges and broad intervening basins.

BASIN AND RANGE PHYSIOGRAPHIC PROVINCE. A province in the southwestern United States characterized by a series of tilted fault blocks forming longitudinal ridges or mountains and broad intervening basins.

BITUMINOUS COAL. A soft coal high in carbonaceous matter, having between 15 and 50 percent volatile matter.

BOLSON. A flat-floored desert valley that drains toward a playa or central depression.

BROWSE. (noun) That part of leaf and twig growth of shrubs, woody vines, and trees available for animal consumption. (verb) To consume browse.

BUREAU SENSITIVE. Fish, wildlife, and plants which are candidates for Federal listing or species proposed for Federal listing automatically become Bureau Sensitive species.

CALICHE. A layer in the soil more or less cemented by calcium carbonates ($CaCO_3$), commonly found in arid and semiarid regions.

CAMPSITE. A cultural site type representative of all periods consisting of temporary habitation areas which usually contain a lithic scatter, evidence of fire use, ground stone, and pottery scatter.

CARRYING CAPACITY. Maximum stocking rate possible without inducing damage to vegetation or related resources. It may vary from year-to-year on the same area due to fluctuating weather conditions and forage production. (See Grazing Capacity.)

CHIHUAHUAN DESERT SHRUBS. Shrubs characteristic of the Chihuahuan Desert such as creosotebush, tarbush, tobosa, burro grass, and mesquite.

CLIMAX VEGETATION COMMUNITY. The vegetation community which emerges after a series of successive vegetation stages and perpetuates itself indefinitely unless disturbed by outside forces.

CLOSED BASIN. A basin is considered closed with respect to surface flow if its topography prevents the occurrence of visible outflow. It is closed hydrologically if neither surface nor underground outflow can occur.

COMMUNITY PIT. An area designated for the nonexclusive removal of mineral materials. Designation is based on demand, material availability, and environmental considerations.

CONTROLLED LANDS. Private or state lands within an allotment which are owned or leased by the permittee.

COOL SEASON PLANT SPECIES. A plant that does most of its growing during the early spring and late fall and can set seed at either time.

COOPERATIVE AGREEMENT. Agreement whereby the permittee agrees to provide funds for construction and maintenance of a rangeland development.

COW YEARLONG (CYL). The amount of forage necessary to sustain one cow for a 1-year period. One CYL equals 12 animal unit months.

CRUCIAL HABITAT. Portions of the habitat of a wildlife population that, if destroyed or adversely modified, would result in a reduction of the population to a greater extent than destruction of other portions of the habitat.

CULTURAL RESOURCE INVENTORY CLASSES.

Class I--Existing Data Inventory: an inventory study of a defined area designed to provide a narrative overview (cultural resource overview) derived from existing cultural resource information and to provide a compilation of existing cultural resource site record data on which to base the development of the BLM's site record system.

Class II--Sampling Field Inventory: a sample-oriented field inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a portion of a defined area in a manner which will allow an objective estimate of the nature and distribution of cultural resources in the entire defined area. The Class II inventory is a tool utilized in management and planning activities as an accurate predictor of cultural resources in the area of consideration. The primary area of consideration for the implementation of a Class II inventory is a planning unit. The secondary area is a specific project in which an intensive field inventory (Class III) is not practical or necessary.

Class III--Intensive Field Inventory: an intensive field inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a specified area. Normally, upon completion of such inventories in an area, no further cultural resource inventory work is needed. A Class III inventory is appropriate on small project areas, all areas to be disturbed, and primary cultural resource areas.

CULTURAL RESOURCE MANAGEMENT PLAN. An activity plan for cultural resources, prepared for a specific area in consultation with the State Historic Preservation Officer which prescribes specific management actions necessary to protect, stabilize, or manage cultural resources.

DEFERRED ROTATION GRAZING. Discontinuance of grazing on various parts of rangeland in succeeding years, allowing each part to rest successively during the growing season to permit seed production, establishment of seedlings, or restoration of plant vigor. At least two, but usually three or more separate units are required. Control is usually ensured by unit fencing, but may be obtained by camp unit herding.

DESIRABLE FORAGE PLANT. Plants which are palatable and productive forage species, generally dominant under climax or near climax conditions, long-lived, and have deep fibrous roots to protect the watershed against erosion.

DIGITIZING. Refers to the Automated Digitizing System, a computer graphics and information system. It contains several software modules, each of which performs separate but related tasks such as data input, file editing, statistical and analytical functions (MOSS software), and plot production. This computer process was used to graphically compute acres by land status, allotment, site write-up area, range site, vegetation subtype, ecological condition class, standard habitat site, or a combination of these.

DIRECT IMPACT. Income, employment, or population changes resulting from permitted grazing level adjustments.

DISCHARGE. Rate of flow at a given instant in terms of volume per unit of time; pumping discharge equals pumping rate, usually given in gallons per minute (gpm); stream discharge, usually given in cubic feet per second (cfs).

DIVERSITY. The relative degree of abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

DIVERSITY INDEX. A number that indicates the relative degree of diversity in habitat per unit area.

DRAINAGE BASIN. A part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded water.

EARTHEN STOCK TANK. Usually a permanent earthen structure for holding water temporarily. These are built in high rainfall runoff areas such as an arroyo, canyon, or swale area.

EASEMENT. A written and recorded document that ensures access across a described parcel of land, along a described route.

ECONOMIES OF SCALE. Reductions in unit cost of output resulting from the production of additional units in an economic sector.

ECOSYSTEM. An interacting natural system including all the component organisms together with its nonliving environment; a community together with its environment; an ecological system.

EMPLOYEE COMPENSATION. Wages and salaries paid to employees by the firm within each sector.

EMPLOYMENT. Number of jobs required to produce the output of each sector.

ENDANGERED SPECIES.

Federally Listed: any species of animal or plant in danger of extinction throughout all or a significant portion of its range.

State (Group I): species whose prospect of survival or recruitment in the State are in jeopardy in the foreseeable future.

State (Group II): species whose prospect of survival or recruitment within the State may become jeopardized in the foreseeable future.

ENVIRONMENTAL ASSESSMENT (EA). A concise public document for which a Federal agency is responsible that serves to: (a) briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact;

(b) aid an agency's compliance with the National Environmental Policy Act (NEPA) when no environmental impact statement is necessary; (c) facilitate preparation of a statement when one is necessary. An EA includes brief discussions of the need for the proposal, of alternatives as required by Sec. 102(2) of NEPA, of the environmental impacts of the proposed action and other alternatives, and a listing of agencies and persons consulted.

EPHEMERAL STREAM. A stream or portion of a stream which flows only in direct response to precipitation. Such flow is usually of short duration.

EROSION CONTROL STRUCTURES. (or EROSION DIKE.) Usually one large earthen, rock, wire, or cement structure used to hold large concentrated flows of water and release this water in small noneroding amounts.

ESOPHAGEAL FISTULATED ANIMAL. An animal used for dietary studies specifically to determine plant preferences. An opening is made in the animal's esophagus to take direct samples.

FAULT-BLOCK. A block of the earth's crust bounded on at least two opposite sides by faults; it may be elevated or depressed relatively to the adjoining region.

FECAL ANALYSIS. A technique for determining diet by microscopic examination of fecal material.

FEDERAL GOVERNMENT EXPENDITURES. Total purchases by Federal Government agencies within the Resource Area economy from producing sectors inside and outside the Resource Area economy.

FLOODPLAIN. Land bordering a stream. The land was built up of sediment from overflow of the stream and is still subject to flooding when the stream is at flood stage.

FLPMA. Federal Land Policy and Management Act of 1976, which mandated the BLM Wilderness Review. Often referred to and pronounced "FLIPMA".

FORAGE. All browse and herbaceous foods available to grazing animals.

FORAGE ALLOTMENT. The amount of or percentage of the total forage produced which is designated for a particular use such as livestock grazing, wildlife, or watershed protection.

FORAGE (COMPETITIVE). Plants which are used as food by large herbivores such as cattle, and by large and small wildlife.

FORAGE VALUE CLASS. Is based on the percent of desirable forage species present (quality and quantity) for livestock and the existing erosion condition of the site. Existing forage value class is determined by direct field examination.

Good Forage Value Class: Rangeland is in good condition when plant composition is 40 percent or more of both desirable and intermediate species. At least 20 percent of the composition is made up of desirable species. Species composition was determined by using pace-point transect procedures.

Fair Forage Value Class: Rangeland is in fair condition when the plant composition is 15 to 39 percent of desirable and intermediate species. At least 5 percent or more of the composition is made up of desirable species. Fair ratings are also applied when the composition comprises 60 percent or more of intermediate species and less than 5 percent desirable species. Composition by species was determined by pace-point transect procedures.

Poor Forage Value Class: Rangeland is in poor condition if the plant composition is less than 15 percent desirable and intermediate species.

FORB. Any herbaceous nonwoody plant that is not a grass or grass-like plant.

FORMATION. The primary unit of formal mapping or description. Most formations possess certain distinctive or combinations of distinctive lithic features. Boundaries are not based on time criteria. Formations may be combined into groups or subdivided into members.

GEOTHERMAL ENERGY. Useful energy that can be extracted from naturally occurring steam, hot water, or hot rock in the earth's crust.

GRABEN. A block generally long compared to its width that has been down thrown along faults relative to the rocks on either side.

GRAZING CAPACITY. The maximum livestock stocking rate possible without inducing damage to vegetation or related resources such as watershed. This incorporates factors such as suitability of the rangeland for grazing as well as the proper use which can be made on all of the plants within the area. Normally expressed in terms of acres per animal unit month (Ac/AUM) or sometimes referred to as the total AUMs that are available in any given area, such as an allotment. Areas that are unsuitable for livestock use are not computed in the grazing capacity. Grazing capacity may or may not be the same as the stocking rate.

GRAZING DISTRICT (BOUNDARY). Is the specific area within which the public land is administered under Section 3 of the Taylor Grazing Act. Public land outside grazing district boundaries is administered under Section 15 of the Taylor Grazing Act.

GRAZING LEASE. A document authorizing use of public land outside grazing districts for the purpose of grazing livestock under Section 15 of the Taylor Grazing Act.

GRAZING MANAGEMENT TREATMENT. Under a grazing system, grazing or resting a particular unit of land (usually a pasture) at particular times each year to attain specific multiple-use goals.

GRAZING PERMIT. A document authorizing use of public land within a grazing district for the purpose of grazing livestock under Section 3 of the Taylor Grazing Act.

GRAZING PREFERENCE. The total number of animal unit months of livestock grazing on public land apportioned and attached to base property owned or controlled by a permittee or lessee.

GROSS OUTPUT. The value, in producer prices, of all outputs produced by the industries in a sector during 1977. Total gross output is the sum of all sales of an industry during a calendar year.

HABITAT. An area where a plant or animal lives. Sum total of environmental conditions in the area.

HABITAT MANAGEMENT PLAN (HMP). A written and officially approved plan for a specific geographical area of public land which identifies wildlife habitat and related objectives, establishes the sequence of actions for achieving objectives, and outlines procedures for evaluating accomplishments.

HEAT FLOW. Dissipation of heat coming from within the earth by conduction or radiation at the surface.

HERD MANAGEMENT AREA PLAN (HMAP). An activity plan which addresses the management of wild horses or burros and their habitat on one or more herd management areas.

HERD UNIT. Big game habitat within a defined geographical area designated by the New Mexico Department of Game and Fish for management purposes.

HISTORIC CULTURAL RESOURCES. Historic cultural resources include all mines, ranches, towns, resorts, railroads, trails, and other evidence of human use from the entrance of the Spanish to 1932.

HYDROCARBONS. Any organic compound, gaseous liquid, or solid consisting solely of carbon and hydrogen, such as crude oil.

IGNEOUS ROCKS. Rocks formed by solidification of magma.

IMPACT PROGRAM. A module which utilizes changes in commodity outputs from the base year, inverted Leontief matrix, and a set of expenditures to depict economic impacts for the different planning alternatives.

INPUT-OUTPUT MODEL. An economic model used to predict or stimulate the Resource Area economy.

INTERIOR FENCE. Fences used to divide allotments into pastures or holding areas.

INTERMEDIATE. (Rocks) An igneous rock containing between 52 and 66 percent silica.

INTERMEDIATE FORAGE PLANT. Plants which are of secondary importance in the climax condition. They replace the desirable plants as conditions deteriorate and replace the less desirable plants as conditions improve. They may be less palatable to grazing animals or be resistant to grazing use.

INTERMEDIATE OUTLAY. Sum of all purchases of outputs produced by other industries inside the region and used as inputs in the production process of an industry.

KEY FORAGE SPECIES. Forage species whose use serves as an indicator of the degree of use of associated species.

KIND OF LIVESTOCK. Kinds of domestic livestock grazing on rangeland including cattle, horse, sheep, goats, or a combination of these. May be broken down to greater detail such as cows with calves, yearlings, steers, ewes, ewes with lambs, etc.

LACUSTRINE. Produced by or belonging to lakes.

LAND TENURE ADJUSTMENT. Refers to changes made in the ownership pattern of public land in order to adjust the Resource Area land base. Using various authorities (exchanges, sales, Recreation and Public Purposes patents, etc.), these changes improve the management of public, private, and State lands.

LEASABLE MINERALS. Mineral commodities including hydrocarbons, geothermal energy, sodium, phosphate, and potassium available for leasing under the Mineral Leasing Act of 1920.

LEAST DESIRABLE FORAGE PLANTS. Plants which are definitely the poorer species in a type of community and consist principally of invaders, noxious, or low-value forage plants.

LEGAL ACCESS. An instrument granting the right to cross privately-owned or State-owned land in order to reach public land. The document conveying this right is an easement or right-of-way.

LIFE ZONES. Any series of biogeographic zones into which a continent, region, etc., is divided by latitude and altitude on the basis of the characteristic animal and plant life in a zone.

LITHIC SCATTER. A prehistoric cultural site type where flakes, cores, and stone tools are located either through the manufacture or use of the tools.

LOCATABLE MINERAL RESOURCES. Metallic and nonmetallic minerals (such as gold, lead, barite, fluorspar) open to mining claim location under the 1872 mining law.

LONG-TERM. Twenty years and beyond; approximately the year 2006.

LOWER SONORAN LIFE ZONE. The life zone which extends from an elevation of about 2,817 to 5,000 feet. The major floral type is desert shrub.

MAJOR LAND RESOURCE AREA (MLRA). Large geographic areas of land characterized by particular patterns of soil, climate, water resources, and land use.

MANAGEMENT FRAMEWORK PLAN (MFP). A planning decision document that establishes for a given planning area land use allocations, coordination guidelines for multiple use, and management objectives to be achieved for each class of land use or protection. A MFP is prepared in three steps: (1) resource recommendations, (2) impact analysis and alternative development, and (3) decisionmaking.

MESOZOIC. One of the eras of geologic time ranging from approximately 240 to 63 million years ago.

METRIC MEASURES.

milligrams per liter (mg/l) = parts per million
milligrams (mg) = mg x 1000 = grams
gram (g) = g x 453.6 = pounds
liter (l) = l x 1.057 = quarts
milimeter (mm) = mm x 25.4 = inches
centimeter (cm) = cm x 2.54 = inches

MILLIGRAMS PER LITER (mg/l). The weight in milligrams of any substance contained in one liter of liquid.

MOGOLLON. One of the three major cultural traditions in the Southwest. It spans a time period of about 200 BC to AD 1200. In the Resource Area, it is divided into the Mimbres and Jornada sequences which intermingle between the Rio Grande and the Black Range. It is characterized by increasingly complex agricultural practices and habitation patterns as well as increasing trade with other regions.

NONCASH RECEIPTS. Number changes in a herd from January 1 to December 31 by age, sex, and type of livestock, multiplied by the ending inventory values per head. (Definition from Organization Costs and Returns of Cattle Ranches in Southeastern New Mexico, 1978. New Mexico State University, Agricultural Experiment Station, Bulletin 684.)

OFF-ROAD VEHICLE (ORV). Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other terrain excluding: (a) any nonamphibious registered motorboat; (b) any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (c) any

vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (d) vehicles in official use; and (e) any combat or combat support vehicle when used in times of National defense emergencies.

OFF-ROAD VEHICLE DESIGNATIONS.

Open--designated areas and trails where off-road vehicles may be operated subject to the BLM operating regulations and vehicle standards.

Limited--designated areas and trails where the use of off-road vehicles is subject to restrictions deemed appropriate by the authorized officer.

Closed--designated areas and trails where the use of off-road vehicles is permanently or temporarily prohibited.

OPTIMUM NUMBERS. (Big Game) A reasonable number of supportable animals under multiple use with proper habitat management and improvement.

PALATABILITY. The relish with which a particular plant species or part is consumed by an animal. The palatability of a plant is usually related to its ecological significance as far as succession is concerned. Highly palatable plants are usually those which are a desirable species and decrease with increasing grazing pressure. Conversely, a low palatability usually characterizes a species which is least desirable and which increases with increasing grazing pressure.

PALEOZOIC. One of the eras of geologic time ranging from approximately 570 to 240 million years ago.

PAYMENT IN LIEU OF TAXES. Payments received by individual counties from the Federal Government for Federal lands within the counties. Total Federal acreage and population are used to determine the funding levels.

PERENNIAL PLANT SPECIES. A plant that has a life cycle of 3 years or more.

PERENNIAL STREAM. A stream or portion of a stream which flows continuously.

PERIOD OF USE. The times of the year when domestic animals would be allowed to graze on a specific unit of rangeland as designated by license.

PERSONAL CONSUMPTION EXPENDITURES. Total purchases of residents within the Resource Area economy from each producing sector.

PETROGLYPH. A form of rock art manufactured by incising, scratching, or pecking designs into rock surfaces.

pH. The negative logarithm of the effective hydrogen-ion concentration or hydrogen-ion activity (in gram equivalents per liter) used in expressing both acidity and alkalinity on a scale whose values run from 0 to 14. Seven represents neutrality, numbers less than 7 increasing acidity, and numbers greater than 7 increasing alkalinity.

PLANT COMMUNITY. One or more plant species growing in association on a given location or area.

POINT PACE TRANSECTS. A method of estimating the vegetative ground cover which occurs on a predetermined transect line. A notch 1/8 inch wide and 1/16 inch deep is made on the sole of the toe of the boot. As that toe touches the ground, whatever is under or above the notch is recorded, i.e., live vegetation (species), litter (dead vegetative matter), rock, and bare ground.

PORPHYRY COPPER. Disseminated replacement deposit in which the copper minerals occur as discrete grains and veinlets throughout a large volume of rock. A large tonnage, low grade deposit.

POTTERY SCATTER. A Mogollon to Historic cultural site type where pot-sherds are concentrated; usually a small site.

PREFERENCE. See Grazing Preference.

PROPER USE FACTOR (PUF). Represents the average weight percentage of a particular plant species (in relation to all other species) that can be safely grazed without restricting forage capacity production.

PROVINCE. A large area or region unified in some way and considered as a whole.

PSEUDORIPARIAN AREAS. Intermittent drainages (arroyos) supporting a more varied vegetation composition than the surrounding upland areas.

PUBLIC LAND. Any land and interest in land owned by the United States and administered by the Secretary of the Interior through the Bureau of Land Management, without regard to how the United States acquired ownership, except:

--lands located on the Outer Continental Shelf

--lands held for the benefit of Indians, Aleuts, and Eskimos

--lands in which the United States retains the minerals, but surface is private.

QUARRY. A Prehistoric cultural site type containing materials used in the manufacture of stone tools. All steps in the manufacture of tools from natural rock to finished tools are present.

RANCH BUDGET. An itemized summary of the expenditures and receipts of a typical ranch operation.

RANCH SIZE CATEGORIES.

Large Cow-Calf Ranch Category: includes ranch operations with herd sizes of 500 animal units (AUs) and more.

Medium Cow-Calf Ranch Category: includes ranch operations with herd sizes of 200-499 AUs.

Small Cow-Calf Ranch Category: includes ranch operations with herd sizes of 1-199 AUs.

Medium Cow-Sheep Ranch Category: includes ranch operations with herd sizes of 200-600 AUs and which over half of the animal units were sheep.

RANGE BETTERMENT FUND. The separate account in the National Treasury established by Section 401(b)(1) of the Federal Land Policy and Management Act of 1976, consisting of 50 percentum of all monies received by the United States as fees for grazing livestock on public land.

RANGE LIVESTOCK SECTOR. Ranch operations that are dependent on BLM rangeland within the Resource Area economy.

RANGE SITE. Rangeland that differs in its ability to produce a characteristic natural plant community. A range site is the product of all the environmental factors responsible for its development. It is capable of supporting a native plant community typified by an association of species that differ from other range sites in the kind or proportion of species or in total production.

RANGELAND. Land used for grazing by livestock and big game animals on which the vegetation is dominated by grasses, grass-like plants, forbs, or shrubs.

RANGELAND CONDITION (ECOLOGICAL). The present state of the vegetation on a range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site. Rangeland condition is basically an ecological rating of the plant community.

Four classes are used to express the degree to which the composition of the present plant community reflects that of the climax.

Ecological Condition Class	Percentage of Present Plant Community that is Climax for the Range Site
Excellent	76 - 100
Good	51 - 75
Fair	26 - 50
Poor	0 - 25

RANGELAND CONDITION TREND. The direction of change in rangeland condition.

RANGELAND DEVELOPMENT. Any structure or excavation which facilitates management of rangeland or livestock.

RANGELAND IMPROVEMENT. Any activity or program on or relating to rangelands which is designed to improve production of forage, change vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, and provide habitat for livestock or wildlife. Includes both rangeland developments and vegetation treatments.

RARE EARTH MINERALS. A group of rare metals very similar to each other and to aluminum in many properties.

RECREATION OPPORTUNITY SPECTRUM (ROS). Continuum used to characterize recreation opportunities in terms of setting, activity, and experience opportunities.

REGION REPORT. First step in producing the input-output model for the Resource Area economy. The report combines county-level totals by sector into a file representing total activity for the economy.

RESOURCE AREA ECONOMY. The two-county area of Otero and Sierra encompassing the White Sands Resource Area.

RHIZOME. A horizontal underground stem which produces roots below and sends up shoots developing into a new plant.

RIFT. A rift or rift zone usually refers to a system of fractures (faults) in the earth's crust and the associated valley or depression.

RIGHT-OF-WAY. An easement, license, or permit that grants the right of use only. May include a road, pipeline, communication site, etc.

RIPARIAN VEGETATION. Vegetation which occurs in or adjacent to essentially perennial drainage ways or their floodplains.

ROCK ART (PETROGLYPH OR PICTOGRAPH). An Archaic to Modern cultural site type consisting of incised figures such as people, animals, plants, or abstracts on a rock surface.

ROCK SHELTER. A cultural site type representative of all periods consisting of an area protected by an overhanging cliff. Often associated with the same materials as a campsite or rock art.

SALEABLE MINERALS. Common variety mineral materials including sand and gravel, clay, cinder, petrified wood, pumice, pumicite, and stone available for sale under the Material Sale Act of 1947.

SCALE/LISTER REPORT. This report produces a regional input-output matrix for the Resource Area economy. Lister portion of the report is capable of producing a combination of seven different sets of reports from the results of Scale.

SCALPING. Removal of sod or other vegetation in spots or strips.

SHORT-TERM. Ten years or less; approximately the year 1996.

SITE WRITE-UP AREA (SWA). Small delineated geographical unit used as a base for collecting vegetation data. It may consist of an entire range site or portion of a unit. It may contain more than one present or potential plant community where soil-vegetation complexes occur that cannot be delineated.

STOCKING RATE. The number of specified kind and class of animals grazing a unit of land for a specified period of time; may be expressed as a ratio, such as animal unit (AU)/section, acres/AU, or acres/animal unit month.

STOLON. An above ground branch, runner, or prostrate stem which takes root at the tip and eventually develops into a new plant.

STORAGE TANK. A permanent water holding structure used to supply water to troughs, pipelines, etc.

SUB-BITUMINOUS COAL. Type of coal between lignite and bituminous, sometimes grading into black lignite, with calorific values ranging from 8,300-13,000 British thermal units (Btu's).

SURFACE RUNOFF. That part of the runoff which travels over the soil surface to the nearest stream channel.

SUSPENDED PREFERENCE. That portion of a grazing preference which has been suspended and for which active grazing use will not be reauthorized until forage is available and allocated for livestock grazing use on a sustained yield basis.

SUSTAINED YIELD. Management of a biological resource (as timber) such that the portion removed by one harvest is replaced by growth or reproduction before another harvest occurs.

TERTIARY. The older of the two geologic periods comprising the Cenozoic era, ranging from approximately 63 to 2 million years ago.

THERMIC TEMPERATURE REGIME. (Soils) Soils in which the mean annual soil temperature is 15°C (59°F) or higher, but lower than 22°C (72°F) and the difference between mean summer and mean winter soil temperature is more than 5°C at a depth of 50 centimeters (approximately 20 inches) or at a lithic or paralithic contact, whichever is shallower.

THREATENED SPECIES. Any species likely to become endangered within the forseeable future throughout all or a significant part of its range.

TOTAL DISSOLVED SOLIDS (TDS). An aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, nitrates, etc., of calcium, magnesium, manganese, sodium, potassium, and other cations which form salts.

TRAIL. An identifiable route that permits the passage of foot traffic or two-wheeled vehicles.

TRANSECT. The area on which inventory data are gathered such as along a line, at points along a line, or over an area of a designated width and length.

UNALLOTTED FEDERAL LAND. Federal land which currently is not committed to livestock grazing use.

UNCONTROLLED LANDS. Private or state lands within an allotment that are not owned or leased by the permittee.

UNDERSTORY. The plants growing beneath the canopy of other plants.

UPPER SONORAN. The life zone which extends from an elevation of about 4,500 to 8,000 feet. The major floral type is pinyon-juniper.

USEABLE FORAGE. That forage which is available for livestock and wildlife after the proper use factors for key forage species on specific range sites have been reached.

UTILIZATION. The proportion of a year's forage production that is consumed or destroyed by grazing animals, usually expressed as a percentage. Percentage breakdowns are slight 0-20 percent, light 21-40 percent, moderate 41-60 percent, heavy 61-80 percent, and severe 81-100 percent.

VEGETATION COMPOSITION. The proportion of the total vegetation cover or weight provided by each species, expressed in percent.

VEGETATION SUBTYPE. See Aspect Species.

VEGETATION TREATMENTS. Methods used to control the growth and spread of undesirable vegetation. Control can be by chemical or mechanical means or by fire.

VILLAGE. A Mogollon to Historic cultural site type consisting of a permanent habitation area containing many types of artifacts, evidence of agriculture, and structures.

VISUAL RESOURCES MANAGEMENT (VRM) CLASSES. VRM Classes are based on relative visual ratings of inventoried lands. Each class describes the different degree of modification allowed to the basic elements of the landscape. The following are the minimum management objectives for each class.

Class I: Natural ecological changes and very limited management activity are allowed. Any contrast created within the characteristic landscape must not attract attention. This classification is applied to Visual Areas of Critical Environmental Concern, wilderness areas, wild and scenic rivers, and other similar situations.

Class II: Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the landscape. A contrast may be seen but should not attract attention.

Class III: Contrasts to the basic elements caused by a management activity may be evident and begin to attract attention in the landscape. The changes, however, should remain subordinate in the existing landscape.

Class IV: Contrasts may attract attention and be a dominant feature in the landscape in terms of scale. However, the changes should repeat the basic elements of the landscape.

WARM SEASON PLANT SPECIES. A plant that does most of its growing during the spring and summer and sets seed in the late summer or early fall. It is normally dormant in winter.

WATER DEPLETION. Water supply consumptively used and no longer available as a water source.

WATER SPREADER. Usually several small, earthen, rock structures used to slow the water flow and give the runoff a chance to be absorbed by the soils and plants.

WATERSHED MANAGEMENT PLAN. Activity plan for the implementation of land management practices, both structural and nonstructural, which restore, maintain, or improve watershed condition.

WILDERNESS. The definition contained in Section 2(c) of the Wilderness Act of 1964 is as follows: "A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." Wilderness is an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features or scientific, educational, scenic, or historical value.

WILDERNESS CHARACTERISTICS. Those characteristics of wilderness as described in Section 2(c) of the Wilderness Act. These include size, naturalness, solitude, primitive and unconfined type of recreation, and supplemental values.

WILDERNESS STUDY AREA (WSA). An area with wilderness characteristics.

WILDLIFE. Includes all species of mammals, birds, molluscs, crustaceans, amphibians, reptiles, or their progeny or eggs which, whether raised in captivity or not, are normally found in a wild state. Feral horses and burros are excluded.

WITHDRAWAL. An action that restricts the use of public land and segregates the land from some or all of the public land or mineral laws.

WORST CASE. Since the exact livestock allocation at the end of the monitoring period is unknown, the worst case analysis assumes a certain reduction in AUMs for each alternative as the maximum forseeable reduction.

YEARLING. An animal approximately 1 year of age. A short yearling is from 9 to 12 months of age and a long yearling is from 12 to 18 months.

YEARLONG GRAZING. Continuous grazing for a calendar year.

YEARLONG RANGELAND. Rangeland that is or can be grazed yearlong.

ZEOLITES. A large group of minerals that are characterized by their easy and reversible loss of water. They are used in the base exchange method of water softening and as gas absorbents or drying agents (filters).

ACRONYMS AND ABBREVIATIONS

ac	acre
Ac/AUM	Acres per Animal Unit Month
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ADC	Animal Damage Control
AMP	Allotment Management Plan
AUM	Animal Unit Month
C&MU	Classification and Multiple Use Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act
FWS	U.S. Fish and Wildlife Service
HMP	Habitat Management Plan
MFP	Management Framework Plan
mg/l	milligrams per liter
MLRA	Major Land Resource Area
NA	No Action Alternative
NMDGF	New Mexico Department of Game and Fish
NMSU	New Mexico State University
NSO	No Surface Occupancy
ORV	Off-Road Vehicle
RMP	Resource Management Plan
SCS	Soil Conservation Service
SHF	Standard Habitat Feature
SHPO	State Historic Preservation Office
SHS	Standard Habitat Site
SWA	Site Write-up Area
TDS	Total Dissolved Solids
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
WSA	Wilderness Study Area

REFERENCES CITED

REFERENCES CITED

Altom, J. D., and Stritzke, J. F. "Degradation of Dicamba, Picloram and Four Phenoxy Herbicides in Soils." Weed Science, 21 (1973): 556-560.

Alward, G. S.; Palmer, C. J. IMPLAN: An Input-Output Analysis System for Forest Service Planning. Fort Collins, Colorado: U.S. Forest Service, 1983.

Alward, G. S.; Palmer, C. J; and Lofting, E. IMPLAN: Forest Service Economic Impact Model (An Explanation of How the Data Base was Developed for the IMPLAN System). Fort Collins, Colorado: U.S. Forest Service, 1983.

Anderson, E. C. "The Metal Resources of New Mexico and Their Economic Features Through 1954." State Bureau of Mines and Mineral Resources, Bulletin 39. Socorro, New Mexico: New Mexico Institute of Mining and Technology, 1957.

Arizona Interagency Range Committee. Grazing Systems for Arizona Ranges. Washington, D.C.: U.S. Government Printing Office, 1974.

Baur, J. R. "Effects of Picloram and Tebuthiuron on Establishment of Ryegrass Winter Pasture." Journal of Range Management, 31(6) (1978): 450-455.

Baur, J. R.; Bovey, R. W.; and McCall, H. G. "Thermal and Ultraviolet Loss of Herbicides." Pesticide Abstract, 8(4) (1974): 217.

Beck, R. F. New Mexico State University. Vegetation Response to Decreased Cattle Use and Little or No Brush Control. (Telephone Conversation) Bea Wade, Las Cruces/Lordsburg MFP Amendment/EIS Team Range Conservationist. BLM, Las Cruces District Office, October 7, 1982.

Black, B. A. "Geology of the Northern and Eastern Parts of the Otero Platform, Otero and Chavez Counties: New Mexico." Ph.D. Dissertation. Albuquerque, New Mexico: University of New Mexico, 1973.

Blydenstein, J.; Hungerford, C. R.; Day, G. I.; and Humphrey, R. R. "Effect of Domestic Livestock Exclusion on Vegetation in the Sonoran Desert." Ecology, 38(5) (1957): 522-526.

Bodine, M. W., Jr. "Geology of Capitan Coal Field, Lincoln County, New Mexico." State Bureau of Mines and Mineral Resources Circular 35. Socorro, New Mexico: New Mexico Institute of Mining and Technology, 1956.

REFERENCES CITED

Boster, R. S., and Martin, W. E. "The Value of Primary Versus Secondary Data in Interindustry Analysis: A Study in the Economics of the Economic Models." Arizona Agricultural Experiment Station Journal Article 1900. (Purchased by the U.S. Department of Agriculture, Forest Service, for Official Use) Fort Collins, Colorado: U.S. Forest Service, 1983.

Bovey, R. W. "Response of Selected Woody Plants in the United States to Herbicides." U.S. Department of Agriculture Research Service Handbook No. 493. Washington, D.C.: U.S. Government Printing Office, 1977.

Bovey, R. W.; Burnett, E.; Richardson, C.; Merkle, M. G.; Baur, J. R.; and Knisel, W. G. "Occurrence of 2,4,5-T and Picloram in Surface Runoff Water in the Blacklands of Texas." Journal of Environmental Quality, 3 (1974): 61-64.

_____. "Occurrence of 2,4,5-T and Picloram in Subsurface Water in the Blacklands of Texas." Journal of Environmental Quality, 4 (1975): 103-106.

Bovey, R. W., and Mayeux, H. S., Jr. "Effectiveness and Distribution of 2,4,5-T, Triclopyr, Picloram, and 3,6-Dichloropicolinic Acid in Honey Mesquite." Weed Science, 28 (1980): 666-670.

_____. "Uptake and Distribution of 2,4,5-T, Triclopyr, Picloram, and 3,6-Dichloropicolinic Acid in Honey Mesquite." Proceedings of the 33rd Annual Meeting of the Southern Weed Science Society. College Station, Texas: Texas A&M University, 1980.

Bovey, R. W.; Meyer, R. E.; and Hein, H., Jr. "Soil Persistence of Tebuthiuron in the Clayplan Resource Area of Texas." Weed Science, 30 (1982): 140-144.

Bovey, R. W.; Richardson, C.; Burnett, E.; Merkle, M. B.; and Meyer, R. E. "Loss to Spray and Pelleted Picloram in Surface Runoff Water." Journal of Environmental Quality, 7 (1978): 178-180.

Bovey, R. W., and Scifres, C. J. "Residual Characteristics of Picloram in Grassland Ecosystems." Texas Agricultural Experiment Station Bulletin B-1111. College Station, Texas: Texas A&M University, 1971.

Branson, F. A.; Gifford, G. F.; Renard, K. G.; and Hadley, R. F. Rangeland Hydrology. Dubuque, Iowa: Kendall/Hunt Publishing Company, 1981.

Brock, J. H.; Scifres, C. J.; and Hahn, R. R. "Influence of Herbicides on Weed Control and the Establishment of Grasses in Rangeland Reseeding." Texas Agricultural Station Program Report 2811. Rolling Plains, Texas: Texas A&M University, 1970.

Cable, D. R., and Martin, S. C. "Forage Production and Stocking Rates on Southern Arizona Ranges Can Be Improved." U.S. Forest Service Research Note RM-30. Fort Collins, Colorado: Colorado State University, 1964.

Canfield, R. H. "Semi-Deferred Grazing as a Restorative Measure for Black Grama Ranges." Southwestern Forest and Range Experiment Station Research Note No. 80. Washington, D.C.: U.S. Government Printing Office, 1939.

Cole, R. A.; Weigmann, D. L.; and Hayes, M. A Limnological Study of Lake Holloman (Southcentral New Mexico) With Management Recommendations for Multiple Use. (A Final Completion Report to the Bureau of Land Management for Contract No. NM-910-CTO-7) Las Cruces, New Mexico: New Mexico State University, Department of Fishery and Wildlife Sciences, 1981.

Crowder, D. Sierra County Treasurer. 1984 Sierra County Payment in Lieu of Taxes. (Telephone Conservation) Gerald Sanchez, White Sands RMP/EIS Team Economist. BLM, Las Cruces District Office, November 7, 1984.

Currier, W. F.; Norris, L. A.; Gratkowski, H.; and Graham, C. "Report on Background Information of the Phenoxy Herbicides." Santa Fe, New Mexico: BLM, New Mexico State Office, 1972.

Dickson, R. E.; Fisher, C. E.; and Marion, P. T. "Summer Grazing Experiments on Native Grassland at Spur 1942-1947." Texas Agricultural Experiment Station Progress Report 1123. Albuquerque, New Mexico: U.S. Forest Service, 1948.

Dow Chemical Company. "Technical Information on Dowco 290--A New Experimental Herbicide." Midland, Michigan: Dow Chemical Company, Ag-Organics Department, n.d.

Earth Environmental Consultants, Inc. "Water Quality and Quantity, and Sediment Yield Study for the Southern Rio Grande Range EIS Area, New Mexico." (3 volumes) (BLM Contract) Las Cruces, New Mexico: BLM, Las Cruces District Office, 1979.

Farnham, L. L. "Manganese Deposits of New Mexico." Bureau of Mines Information Circular 8030. Socorro, New Mexico: New Mexico Bureau of Mines and Mineral Resources, 1961.

Fryer, J. D.; Smith, P. D.; and Ludwig, J. W. "Long-Term Persistence of Picloram in a Sandy Loam Soil." Journal of Environmental Quality, 8 (1979): 83-86.

Galt, H. D.; Theurer, B.; Ehrenreich, J. H; Hale, W. E.; and Martin, S. C. "Botanical Composition of Diet of Steers Grazing A Desert Grassland Range." Journal of Range Management, 22 (1969): 14-19.

Gonzalez-Rodriquez, J.; Pieper, R. D.; and Smith, G. S. "Botanical Composition of Cattle Diets on Desert Grassland Range." Agricultural Experiment Station Research Report 363. Las Cruces, New Mexico: New Mexico State University, 1978.

REFERENCES CITED

Gould, W. L. "Wind Erosion Curtailed by Controlling Mesquite." Journal Article No. 825. Las Cruces, New Mexico: New Mexico State University, 1982.

Gray, J. R.; Fowler, J. M.; and Jones, M. L. "Organization, Costs, and Returns of Cattle and Sheep Ranches in Southeastern New Mexico, 1978." Agricultural Experiment Station Bulletin 685. Las Cruces, New Mexico: New Mexico State University, 1981.

Gray, J. R.; Fowler, J. M.; and Lansford, V. D. "Preliminary Estimates of 1982 Organization, Costs and Returns of Cattle and Sheep Ranches in the Public Land Area of New Mexico." Departmental Staff Report No. 34. Las Cruces, New Mexico: New Mexico State University, Department of Agricultural Economics and Agricultural Business, 1983.

Gray, J. R.; Jones, M. L.; and Fowler, J. M. "Organization, Costs, and Returns of Cattle Ranches in Southwestern New Mexico, 1979." Agricultural Experiment Station Bulletin 684. Las Cruces, New Mexico: New Mexico State University, 1981.

Gray, J. R.; Steiger, C.; and Fowler, J. M. "Characteristics of Grazing Systems." Agricultural Experiment Station Research Report 467. Las Cruces, New Mexico: New Mexico State University, 1982.

Halifax, J. C., and Scifres, C. J. "Influence of Dicamba on Development of Range Grass Seedlings." Weed Science, 20 (1972): 414-416.

Harbridge House, Inc. "Southwestern New Mexico Social-Economic Profile." (BLM Contract) Denver, Colorado: Harbridge House, Inc., 1978.

_____. "A Socioeconomic Study and Analysis in Support of a Grazing EIS for the Southern Rio Grande." (BLM Contract No. YA-553-RFPO-1036) Las Cruces, New Mexico: BLM, Las Cruces District Office, 1980.

Harley, G. T. "The Geology and Ore Deposits of Sierra County, New Mexico." State Bureau of Mines and Mineral Resources Bulletin 10. Socorro, New Mexico: New Mexico Institute of Mining and Technology, 1935.

Harrer, C. M., and Kelley, F. J. "Reconnaissance of Iron Resources in New Mexico." U.S. Bureau of Mines Information Circular 8190. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1963.

Herbel, C. H. New Mexico State University. Vegetation Response to Decreased Cattle Use and Little or No Brush Control. (Telephone Conservation) Bea Wade, Las Cruces/Lordsburg MFP Amendment/EIS Team Range Conservationist. BLM, Las Cruces District Office, October 5, 1982.

Herbel, C. H., and Gould, W. L. "Managing Semidesert Ranges of the Southwest." Cooperative Extension Service Circular 456. Las Cruces, New Mexico: New Mexico State University, 1980.

Herbel, C. H., and Nelson, A. B. "Species Preference of Hereford and Santa Gertrudis Cattle on a Southern New Mexico Range." Journal of Range Management, 19 (1966): 177-181.

Hester, T. R. "An Archaeological Survey of the Radium Springs Area, Southern New Mexico." Archaeological Survey Report No. 26. San Antonio, Texas: University of Texas at San Antonio, Center for Archaeological Research, 1977.

Holechek, J. L. "Livestock Grazing Impacts on Public Lands: A View Point." Journal of Range Management, 34(3) (1981): 251-254.

Howard, E. V. Metalliferous Occurrences in New Mexico. Santa Fe, New Mexico: State Planning Office, 1967.

Hubbard, J. P.; Conway, M. C.; Campbell, H.; Schmitt, G.; and Hatch, M. D. Handbook of Species Endangered in New Mexico. Santa Fe, New Mexico: New Mexico Department of Game and Fish, 1979.

Jacoby, P. W.; Meadors, D. H.; and Foster, M. A. "Control of Honey Mesquite With 3,6-Dichloropicolinic Acid." Weed Science, 29 (1981): 376-378.

Jacoby, P. W.; Vechert, D. M.; Hartman, F. S. "Control of Creosotebush with Pelleted Tebuthiuron." Weed Science, 30 (1982): 307-310.

Jahns, R. H. "Beryllium and Tungsten Deposits of the Iron Mountain District, Sierra and Socorro Counties, New Mexico." U.S. Geological Survey Bulletin 945-C. Albuquerque, New Mexico: U.S. Geological Survey, 1944.

Johnsen, T. "Picloram in Water and Soil From a Semiarid Pinyon-Juniper Watershed." Journal of Environmental Quality, 9 (1980): 601-605.

Kelley, B. C. and Silver, C. Geology of the Caballo Mountains. Albuquerque, New Mexico: University of New Mexico Press, 1952.

Kitchen, L. M.; Scifres, C. J.; and Mutz, J. L. "Susceptibility of Selected Woody Plants to Pelleted Picloram." Journal of Range Management, 33(5) (1980): 349-353.

Kottlowski, F. E. "Reconnaissance of Commercial High-Calcium Limestones in New Mexico." Circular 60. Socorro, New Mexico: New Mexico Bureau of Mines and Mineral Resources, 1962.

LeBlanc, S. A., and Whalen, M. E. An Archaeological Synthesis of South-Central and Southwestern New Mexico. Albuquerque, New Mexico: University of New Mexico, Office of Contract Archaeology, 1980.

Leifeste, W. F., et al. "Mesquite Control in New Mexico." New Mexico Range Brush and Weed Control Technical Committee Report No. 1. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1982.

REFERENCES CITED

Little, D. E., and Schmutz, E. M. "Effects of 2,4,5-T and Picloram on Broom Snakeweed in Arizona." Journal of Range Management, 23 (1970): 354-357.

Lutz, J. F.; Byers, G. E.; and Sheets, T. J. "The Persistence and Movement of Picloram + 2,4,5-T in Soils." Journal of Environmental Quality, 2 (1973): 485-488.

Martin, S. C. "The Santa Rita Experimental Range: A Center for Research on Improvement of Semidesert Rangelands." Rocky Mountain Forest and Range Experiment Station Research Paper RM-2. Washington, D.C.: U.S. Government Printing Office, 1966.

_____. "Vegetation Changes on Semi-Desert Range During 10 Years of Summer, Winter, And Year-Long Grazing by Cattle." Proceedings of the XI International Grassland Congress, 11 (1970): 23-26.

_____. "Ecology and Management of Southwestern Semidesert Grass-Shrub Ranges: The Status of Our Knowledge." Forest Service Research Paper RM-156. Fort Collins, Colorado: Rocky Mountain Forest and Range Experiment Station, 1975.

_____. "The Santa Rita Grazing System." Proceedings of the First International Rangeland Congress, 1 (1978): 573-575.

Meeves, H. C. "Nonpegmatitic Beryllium Occurrences in Arizona, Colorado, New Mexico, Utah and Four Adjacent States." U.S. Bureau of Mines Report of Investigations 6828. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1966.

Meyer, R. E. "Brush Response to Spacing and Individual Plan Herbicide Treatments." Weed Science, 30(4) (1982): 378-384.

National Research Council. "Principles of Plant and Animal Pest Control II." Weed Control Publication No. 1597. Washington, D.C.: National Academy of Sciences, 1968.

New Mexico Border Development Bureau. A Socio-Economic Profile of the Border Region. Santa Fe, New Mexico: New Mexico State Planning Division, Department of Finance and Administration, 1979.

New Mexico Interstate Stream Commission and The New Mexico State Engineer's Office. Water Resources Assessment for Planning Purposes; Otero County. Santa Fe, New Mexico: New Mexico Interstate Stream Commission, 1975.

New Mexico State Engineer. "Reconnaissance of Ground-Water Conditions in the Crow Flats Area Otero County, New Mexico." Technical Report No. 8. Santa Fe, New Mexico: New Mexico State Engineer's Office, 1957.

_____. Water Resources of New Mexico Occurrence, Development and Use. Santa Fe, New Mexico: New Mexico State Engineer's Office, 1967.

New Mexico State Planning Division. Status of the State 1982. Santa Fe, New Mexico: New Mexico State Planning Division, 1982.

New Mexico State Planning Division, Department of Finance and Administration. New Mexico County and Municipal Governments Twenty-Second Annual Report 1980-81. Santa Fe, New Mexico: New Mexico State Planning Division, Department of Finance and Administration, 1982.

_____. New Mexico Local Governments and the Property Tax 1981 Tax Year. Santa Fe, New Mexico: New Mexico State Planning Division, Department of Finance and Administration, 1982.

Norris, L. A., and Montgomery, M. L. "Dicamba Residues in Streams After Forest Spraying." Bulletin of Environmental Contamination and Toxicology, 13(1) (1975): 1-8.

Northrop, S. A. Minerals of New Mexico. (Revised Edition) Albuquerque, New Mexico: University of New Mexico Press, 1959.

Otero County Assessor. FY83-84 Otero County Mill Rates. (Telephone Conversation) Gerald Sanchez, White Sands RMP/EIS Team Economist. BLM, Las Cruces District Office, November 1, 1984.

Pacific Southwest Interagency Committee (PSIAC). Factors Affecting Sediment Yield and Measures of the Reduction of Erosion and Sediment Yield: Report of the Water Management Subcommittee. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1968.

Palmer, C. J. IMPLAN-SCALE: Supply-Demand Pool Technique for Constructing Regional Interindustry Models. Fort Collins, Colorado: U.S. Forest Service, 1983.

Paulsen, H. A., Jr., and Ares, F. N. "Grazing Values and Management of Black Grama and Tobosa Grasslands and Associated Shrub Ranges of the Southwest." Forest Service Technical Bulletin No. 1270. Washington, D.C.: U.S. Government Printing Office, 1962.

Pieper, R. D., and Beck, R. F. "Importance of Forbs on Southwestern Ranges." Rangelands, 2(1) (1980): 35-36.

Pieper, R. D., and Donart, G. B. "Drought on the Range: Drought and Southwestern (Range [SRG]) Vegetation." Rangeman's Journal, 2(6) (1975): 176-178.

Rosiere, R. E.; Beck, R. F.; and Wallace, J. D. "Cattle Diets on Semidesert Grassland: Botanical Composition." Journal of Range Management, 28(2) (1975): 89-93.

Rothrock, H. E.; Johnson, C. H.; and Hahn, A. D. "Fluorspar Resources of New Mexico." State Bureau of Mines and Mineral Resources Bulletin 21. Socorro, New Mexico: New Mexico Institute of Mining and Technology, 1946.

REFERENCES CITED

Schickedanz, J. Poisonous Range Plants of New Mexico. Las Cruces, New Mexico: New Mexico State University, Cooperative Extension Service, 1981.

Schilling, J. H. "Molybdenum Resources of New Mexico." U.S. Bureau of Mines Bulletin 76. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1965.

Schmutz, E. M. "Chemical Control of Three Chihuahuan Desert Shrubs." Weeds, 15(1) (1967): 62-67.

Scifres, C. J., and Allen, T. J. "Dissipation of Dicamba from Grassland Soils of Texas." Weed Science, 21 (1973): 393-396.

Scifres, C. J., and Halifax, J. C. "Development of Range Grasses Germinated in Picloram." Weed Science, 20 (1972): 341-344.

Severson, K. E., and Medina, A. L. "Deer and Elk Habitat Management in the Southwest." Journal of Range Management Monograph No. 2. Denver, Colorado: Society for Range Management, 1983.

Sierra County Assessor. FY83-84 Sierra County Mill Rates. (Telephone Conversation) Gerald Sanchez, White Sands RMP/EIS Team Economist. BLM, Las Cruces District Office, October 31, 1984.

Siverts, E.; Palmer, C.; Walters, K. (USFS); and Alward, G. S. Rocky Mountain Forest and Range Experiment Station. IMPLAN User's Guide. Fort Collins, Colorado: U.S. Forest Service, 1983.

Sorensen. E. F. "Water Use by Categories in New Mexico Counties and River Basins, and Irrigated Dry Cropland Acreage in 1975." Technical Report 41. Santa Fe, New Mexico: New Mexico State Engineer's Office, 1977.

Sosebee, R. E. "Influence of Tebuthiuron on Forage Puality of Selected Grasses--Preliminary Evaluations." Proceedings of the 32nd Annual Meeting of the Southern Weed Science Society, 1979: 334-346.

Sosebee, R. E., and Dahl, B. E. "Mesquite Spraying on Other Rangeland Resources." (Unpublished Report) Lubbock, Texas: Texas Tech University, 1979.

_____. "Effects of Mesquite Spraying on Other Rangeland Resources." Technical Note No. 341. Denver, Colorado: BLM, Denver Service Center, 1979.

Southern Rio Grande Council of Governments. Overall Economic Development Plan. Las Cruces, New Mexico: Southern Rio Grande Council of Governments, 1977.

Southwest Research and Development Company. Sacramento Social-Economic Profile. (BLM Contract No. YA-512-CT-7-2) Las Cruces, New Mexico: BLM, Las Cruces District Office, 1977.

Stoddart, L. A.; Smith, A. D.; and Box, T. W. Range Management. New York, New York: McGraw-Hill Book Company, 1975.

Sullivan, J. Determining Changes in Final Demand for IMPLAN Economic IMPACT Analysis. Fort Collins, Colorado: U.S. Forest Service, 1983.

Technology Research and Development, Inc. "Water Resources and Soil Loss/ Sediment Yield Investigations of the Sacramento Range Study Area, South-Central New Mexico Vol. I-III." (BLM Contract) Las Cruces, New Mexico: BLM, Las Cruces District Office, 1980.

Trumble, J. M. "Semiarid Rangeland Treatment and Surface Runoff." Journal of Range Management, 29 (1976): 251-255.

U.S. Department of Agriculture, Economics Statistics and Cooperative Service. "Regional Development and Plan Evaluation, The Use of Input-Output Analysis." Agriculture Handbook No. 530. Washington, D.C.: U.S. Government Printing Office, 1978.

U.S. Department of Agriculture, Forest Service. A Proposal for Vegetative Control With Herbicides in the State of New Mexico, Draft Environmental Statement. Albuquerque, New Mexico: U.S. Forest Service, Southwestern Region, 1973.

_____. Final Environmental Statement: Vegetation Management With Herbicides (Volume 1). Portland Oregon: U.S. Forest Service, Pacific Northwest Region, 1978.

U.S. Department of Agriculture, Soil Conservation Service. National Engineering Handbook, Sec. 4, Hydrology. Washington, D.C.: U.S. Government Printing Office, 1972.

_____. "Technical Guide: Range Site Descriptions for SD-2, SD-3 and CP-4." Transmittal Notice No. 427. Albuquerque, New Mexico: Soil Conservation Service, 1980.

_____. Soil Survey of Otero Area, New Mexico. Washington, D.C.: U.S. Government Printing Office, 1981.

_____. Soil Survey of Sierra County, New Mexico. Washington, D.C.: U.S. Government Printing Office, 1984.

U.S. Department of Agriculture and New Mexico Department of Agriculture. New Mexico Agricultural Statistics 1975-1979. (Revised, 1980 Preliminary) Las Cruces, New Mexico: New Mexico Department of Agriculture, 1980.

_____. New Mexico Agricultural Statistics 1982. Las Cruces, New Mexico: New Mexico Department of Agriculture, 1983.

U.S. Department of Commerce, Bureau of the Census. Advance Estimates of Social, Economic and Housing Characteristics, New Mexico. Washington, D.C.: U.S. Government Printing Office, 1982.

U.S. Department of Commerce, Bureau of the Census. (continued)

_____. Census of Population, 1950-1980. Washington, D.C.: U.S. Government Printing Office, 1982.

_____. Characteristics of the Population, Number of Inhabitants, New Mexico. Washington, D.C.: U.S. Government Printing Office, 1982.

_____. General Population Characteristics. Washington, D.C.: U.S. Government Printing Office, 1982.

_____. 1980 Census of Population, New Mexico. Washington, D.C.: U.S. Government Printing Office, 1982.

U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business, 62(4) (1982d): 63.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Climate of New Mexico. Washington, D.C.: U.S. Government Printing Office, 1972.

U.S. Department of the Interior, Bureau of Land Management. Unit Resource Analysis and Management Framework Plan, Mesa Planning Unit. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1974.

_____. New Mexico Water Resources Assessment for Planning Purposes. (Published in Cooperation with the State of New Mexico) Las Cruces, New Mexico: BLM, Las Cruces District Office, 1976.

_____. Environmental Impact Statement, Grazing Management, McGregor EIS Area, New Mexico. Denver, Colorado: U.S. Government Printing Office, 1980.

_____. Interdistrict Agreement Between BLM Roswell District and Las Cruces District (NMSO-147). Roswell, New Mexico: BLM, Roswell District Office, 1980.

_____. Draft Grazing Environmental Impact Statement, Southern Rio Grande Planning Area. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1981.

_____. Rangeland Program Summary for the Southern Rio Grande Planning Area. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1982.

_____. Southern Rio Grande Management Framework Plan. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1982.

_____. Las Cruces District Office Range Inventory Files. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1982-1983.

_____. Las Cruces/Lordsburg Management Framework Plan Amendment/Environmental Impact Statement. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1983.

U.S. Department of the Interior, Bureau of Land Management. (continued)

_____. New Mexico State Office. Typical Appraisal Values and Overview of Appraisal Process. (Telephone Conversation) Gerald Sanchez, White Sands RMP/EIS Team Economist. BLM, Las Cruces District Office, August 8, 1984.

_____. Las Cruces District Office. Cost Estimates for Prescribed Burning and Brush Spraying. (Personal Communication) Gerald Sanchez, White Sands RMP/EIS Team Economist. BLM, Las Cruces District Office, September 17, 1984.

_____. New Mexico State Office. 1984 Payment in Lieu of Taxes for Otero and Sierra Counties. (Telephone Conversation) Gerald Sanchez, White Sands RMP/EIS Team Economist. BLM, Las Cruces District Office, September 27, 1984.

_____. BLM New Mexico Rangeland Studies Handbook. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1984.

_____. Draft San Juan and San Miguel Resource Management Plan and Environmental Impact Statement. Montrose, Colorado: BLM, Montrose District Office, 1984.

_____. "Technical Report, Detailed Methodologies for Developing Range Budgets." (Unpublished) Las Cruces, New Mexico: BLM, Las Cruces District Office, 1984.

_____. Update of the Social-Economic Profile. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1984.

U.S. Department of Interior, Geological Survey. "Mineral and Water Resources of New Mexico." New Mexico State Bureau of Mines and Mineral Resources, Bulletin 87. Albuquerque, New Mexico: State of New Mexico, 1965.

_____. "Leasable Mineral and Waterpower Land Classification Map." U.S. Geological Survey Open-File Report 79-735. Albuquerque, New Mexico: U.S. Geological Survey, 1979.

_____. "Mineral Resource Areas of the Basin and Range Province of New Mexico." U.S. Geological Survey Open-File Report 83-665. Albuquerque, New Mexico: U.S. Geological Survey, 1983.

University of New Mexico, Bureau of Business and Economic Research Data Bank. Birth and Death Rates for Otero and Sierra Counties. (Telephone Conversation) Gerald Sanchez, White Sands RMP/EIS Team Economist. BLM, Las Cruces District Office, January 3, 1984.

_____. Populations Projections for Otero and Sierra Counties. (Telephone Conversation) Gerald Sanchez, White Sands RMP/EIS Team Economist. BLM, Las Cruces District Office, January 3, 1984.

University of New Mexico, Bureau of Business and Economic Research Data Bank. (continued)

_____. County Business Patterns, Total Personal Income, Per Capita Income, and Employment for 1982 for Otero and Sierra Counties. (Telephone Conversation) Gerald Sanchez, White Sands RMP/EIS Team Economist. BLM, Las Cruces District Office, August 8, 1984.

Van Poollen, H. W., and Lacey, J. R. "Herbage Response to Grazing Systems and Stocking Intensities." Journal of Range Management, 32 (1979): 250-253.

Warner, L. A.; Holser, W. T.; Wilmarth, V. R.; and Cameron, E. N. "Occurrence of Nonpegmatite Beryllium in the United States." U.S. Geological Survey Professional Paper 318. Reston, Virginia: U.S. Geological Survey, 1959.

Way, K. L. "Results of the 1978 Field Season at Rattlesnake Hill." M.S. Thesis. Las Cruces, New Mexico: BLM, Las Cruces District Office, 1979.

Weber, R. H., and Kottlowski, F. E. "Gypsum Resources of New Mexico." State Bureau of Mines and Mineral Resources, Bulletin 68. Socorro, New Mexico: New Mexico Institute of Mining and Technology, 1959.

Wilson, J. P. "Historical Profile of Southwestern New Mexico." Cultural Resources Management Division Report No. 21. Las Cruces, New Mexico: New Mexico State University, 1975.

Wimberly, M., and Rogers, A. "Archaeological Survey of the Three Rivers Drainage, New Mexico." The Artifact, 15 (1977).

Yearly, G. Otero County Manager. 1984 Otero County Payment in Lieu of Taxes. (Telephone Conversation) Gerald Sanchez, White Sands RMP/EIS Team Economist. BLM, Las Cruces District Office, November 7, 1984.

INDEX

INDEX

Access 1-5--1-6, 2-5, 2-7, 2-9, 2-11, 2-13, 3-1, 3-3, 3-40, 4-2, 4-3, 4-14, 4-17, 4-21--4-26, 4-31, 4-33, 4-39, 4-40, 4-42--4-46, 4-48, 4-55, 4-57, 4-59, 4-63, 4-66, 4-68, 4-73--4-74
Area of Critical Environmental Concern 2-4, 2-8, 3-32, 4-14, 4-22--4-23, 4-52, 4-57--4-58
Air Quality 2-15--2-16, 4-1
Alternatives, Description of 2-1--2-11
Animal Requirements Constraint I-15
Animal Unit Equivalent I-2
Appraisal Values I-19
Assessed Valuation 3-41, 4-30--4-31, 4-46, 4-62
Attitudes and Values 3-39

Climate
  Affected Environment 3-1
Cow-Calf Operations 3-45--3-46, 4-28, 4-45--4-46, 4-59--4-60, 4-74, I-1, I-3--I-11
Cow-Sheep Operations 3-45--3-46, 4-30, 4-45--4-46, 4-60, 4-74, I-1, I-12--I-14
Cultural Resources
  Affected Environment 3-33--3-36
  Environmental Consequences 4-24, 4-44, 4-58, 4-66, 4-74
  Letters of Consultation H-1

Demographic Characteristics 3-37--3-39, 4-67
Dependency 3-45, 4-76

Ecological Condition Class 3-13, 4-9, 4-16--4-17, 4-35, 4-41, 4-52, C-10, C-14--C-15, C-18, C-22--C-28, D-14--D-16
Education Levels 3-39
Employee Compensation 4-28, 4-30, 4-45--4-46, 4-60, 4-76, I-18
Employee Spending Patterns I-18
Employment 3-40--3-42, 3-45, 4-28, 4-30, 4-45--4-46, 4-60, 4-66--4-67, 4-76, I-17
Estimated Fair Market Value 4-30

Fair Market Value 4-30, 4-46, 4-62
Farm Produced Inputs I-1
Final Demand I-17--I-18
Final Payments I-17
Fire Management 2-25--2-26
5-Year Average 2-2, 2-5, 2-10, 3-45, 4-2, 4-4, 4-16, 4-28, 4-30--4-31, 4-45, 4-50, 4-52, 4-60
Forage Value Class 3-11, 3-13, 3-15, 4-9, 4-13, 4-35, 4-39, 4-52, 4-64, 4-70, C-12, C-18, C-22--C-28

Geology and Minerals
  Producing Areas, Past and Present 3-4--3-5
  Producing Areas, Potential 3-6
Grazing Forage Constraint I-15
Gross Output I-17--I-18
Gross Receipts I-17--I-18

Herbicides
  Proposed for Use 2-20
  Vegetation Treatment Guidelines C-4--C-9
Hired Ranch Labor 4-28, 4-45, 4-60

IMPLAN I-17--I-18

Job Opportunities . . . 4-30, 4-45--4-46, 4-60, 4-67, 4-76

Labor Constraint I-15
Lands
  Affected Environment 3-2
  Environmental Consequences 4-2, 4-31, 4-48
Land Tenure Adjustment 1-4, 1-6, 2-5, 2-6, 2-9, 2-10, 4-4, 4-14, 4-17, 4-19, 4-21, 4-25, 4-30, 4-40, 4-44, 4-50, 4-54--4-56, 4-59, 4-62, 4-66, 4-68, A-1--A-12, I-19
Livestock Adjustments 2-17, 4-26, 4-45
Livestock Grazing
  Affected Environment 3-19--3-20
  Allotment Management Categories 2-16, 4-14--4-16, 4-40, D-1
  Allotment Management Plans (AMPs) 2-2, 2-6, 2-7, 2-10, 2-11, 3-19
  Environmental Consequences 4-14, 4-40, 4-54, 4-64, 4-72
  Production Problems 3-19
  Rangeland Developments (Balanced) 2-3, D-17
  Rangeland Developments (Production) 2-6, D-21
  Rangeland Developments (Protection) 2-7, D-25
Livestock Industry 3-44, 4-76
Livestock and Livestock Products 3-44--3-45
Livestock Sales 3-45, 4-75

Major Employment Sectors 3-41--3-42
Major Issues 1-4--1-5
Major Land Resource Areas 3-7, 3-11, 3-13, 3-15, 3-17--3-18, C-22--C-26
  Southern Desert Subresource Area SD-2 . . . . . 3-7, 3-11, 4-35, C-22--C-24
  Southern Desert Subresource Area SD-3 . . . . . 3-7, 3-11, 4-9, 4-35, C-23--C-26
  Canadian-Pecos Subresource Area CP-4 . . . . . 3-7, 3-11, C-27--C-28
Management Guidance Common to All Alternatives 2-12--2-26
Median Age 3-38--3-39
Mill Rates I-19

Optimum Solution I-15

Payment in Lieu of Taxes 3-41, 4-31, 4-46, I-20
Per Capita Personal Income 3-41, 3-43
Planning Process 1-3--1-4
Plant Species
  Desirable and Intermediate . 4-8--4-9, 4-35, C-12, C-18
  Major 3-11, C-19--C-21
  Poisonous 3-18--3-19, C-33--C-34
  Threatened or Endangered 3-19, 3-30, 4-14, 4-39, 4-54, 4-64, 4-70, C-29--C-32
Population Density 3-35, 3-38
Population Growth Rate 3-37
Population Projections 3-37--3-38
Potential Tax Revenues 4-31, 4-62
Preferred Alternative 1-4--1-5, 4-1
Preparers, List of 5-2--5-4
Production Constraint I-15
Production Input Constraint I-15

Ranch Operation Employment 4-30, 4-46
Rangeland Consultation Policy 2-2, D-2
Recreation
  Affected Environment 3-29--3-31
  Environmental Consequences . . . 4-22, 4-42, 4-57, 4-73
Regional Purchase Patterns I-17
Regional Analysis 4-28, I-17
Resource Area Economy 3-37, 3-41, 4-28, 4-30--4-31, 4-45--4-46, 4-60, 4-62, 4-67, 4-76, I-17--I-18
Review, RMP/EIS 5-6--5-9

Sales Revenue I-15
Sectoral Activity I-17
Site Write-Up Area (SWA) 3-13, 4-9, 4-35, C-10--C-11, C-18
Social and Economic Assumptions 4-26
Social and Economic Conditions
  Affected Environment 3-36--3-46
  Environmental Consequences 4-28, 4-45, 4-59, 4-67, 4-74
Social Values 4-28, 4-30, 4-68
Social Well-Being 4-59, 4-68, 4-74
Socio-Cultural Values 3-40
Soils
  Affected Environment 3-7--3-8
  Environmental Consequences . 4-4, 4-31, 4-50, 4-62, 4-68
  Effects of Chemicals 4-5, 4-32

Total Assessed Valuation I-19
Total Personal Income 3-41--3-43, 4-66
Total Receipts 3-44--3-45, 4-28, 4-30, 4-45--4-46, 4-60, 4-67, 4-75

Value of BLM Permits 4-28, 4-45
Vegetation
  Affected Environment 3-11--3-19
  Apparent Trend 3-13, C-16
  Environmental Consequences . 4-8, 4-34, 4-52, 4-63, 4-70
  Ground Cover 1-4, 3-11, 4-9, 4-14, 4-35, 4-39, 4-52, C-10
  Herbicide Effects 4-10--4-14, 4-37
  Production 2-3, 2-5--2-6, 2-17, 3-11, 3-13--3-14, 3-17--3-18, 4-8--4-9, 4-12--4-14, 4-34--4-35, 4-37--4-39, 4-63
  Range Sites 2-4, 2-8, 2-20, 3-7, 3-11--3-15, 3-17--3-18, 4-9, 4-14, 4-35, 4-39, 4-52, 4-69, C-10, C-14, C-18
  Treatments, Chemical 4-9--4-10, 4-14--4-15, 4-35, 4-37--4-38
  Vegetation Subtypes 3-13, 3-15--3-18, C-10--C-11, C-18, C-22--C-28
Visual Resources
  Affected Environment 3-31--3-32
  Environmental Consequences . . . 4-23, 4-43, 4-57, 4-74
  Management Classes G-1

Water Resources
  Affected Environment 3-8--3-11
  Environmental Consequences . 4-6, 4-33, 4-51, 4-63, 4-69
  Ground Water 3-9--3-10, 4-7, 4-69
  Surface Water 3-8--3-9, 4-6--4-7, 4-69
  Water Use 3-10, 4-7, 4-34, 4-51, 4-63
Wild Burros
  Affected Environment 3-20--3-21
  Environmental Consequences 4-17, 4-40, 4-55, 4-64, 4-72
Wilderness
  Affected Environment 3-32
  Environmental Consequences 4-24, 4-43, 4-74
Wildlife
  Affected Environment 3-21--3-29
    Big Game 3-26, E-3
    Standard Habitat Sites . . . 3-21--3-25, E-1--E-3
  Consultation, Section 7 . . . . . E-4
  Environmental Consequences 4-17, 4-41, 4-55, 4-64, 4-72
  Threatened or Endangered Species 3-29, 3-30, 4-22, 4-42, 4-57
  Special Habitat Features 3-25--3-26

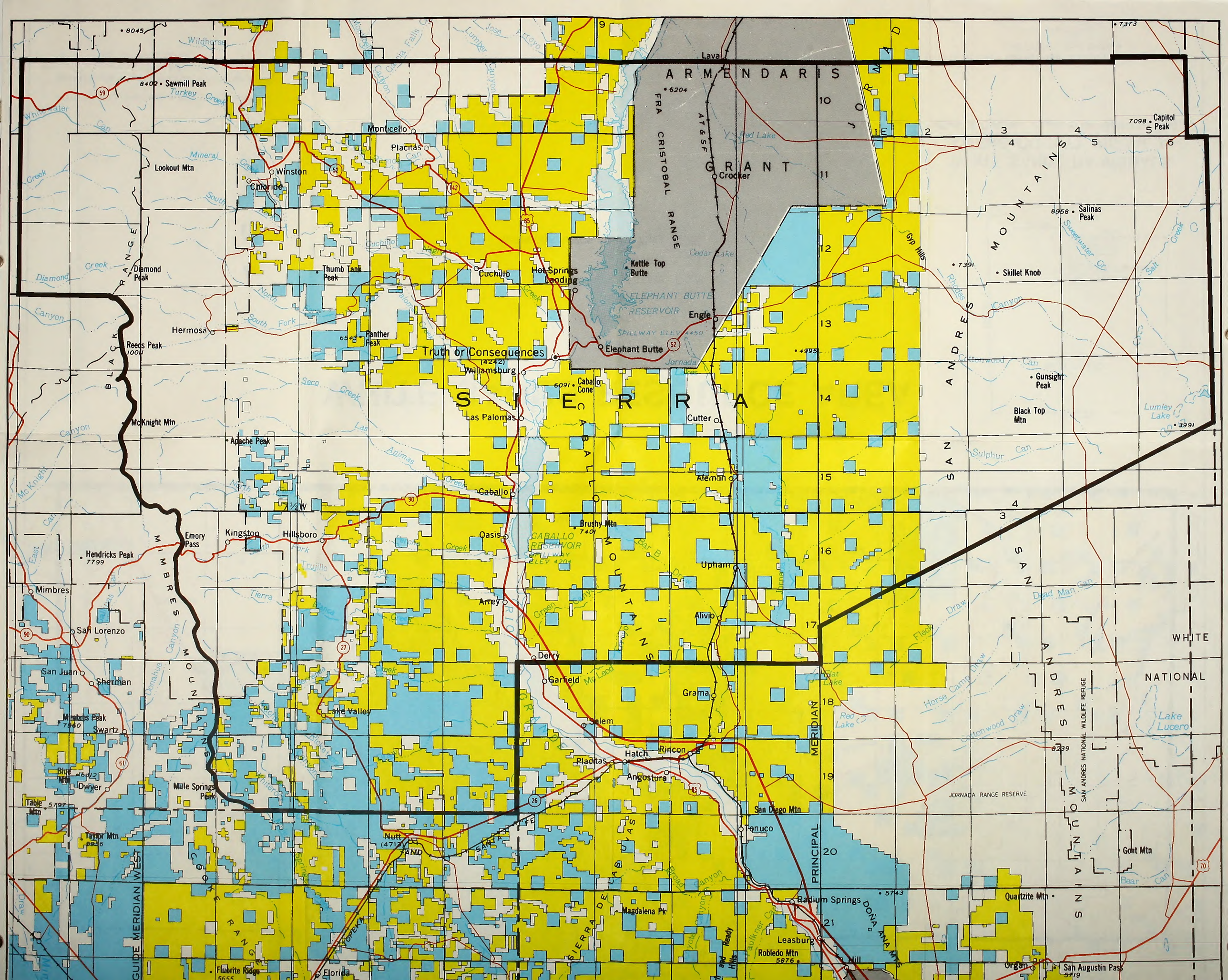
BORROWER'S CARD
7 1985
RMP/EIS "
BORROWER | OFFICE | DATE RETURNED
(Continued on reverse)

BLM LIBRARY
SC-324A, BLDG. 50
DENVER FEDERAL CENTER
P. O. BOX 25047
DENVER, CO 80225-0047

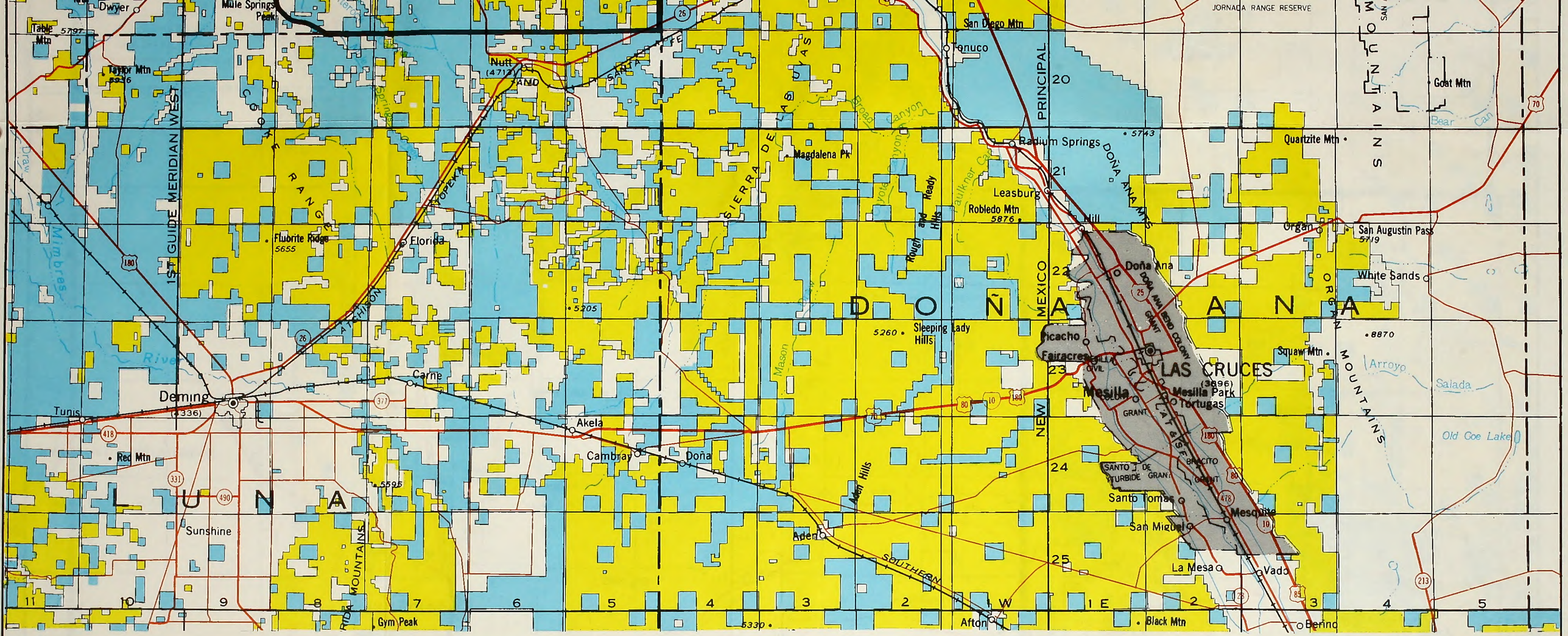
☆U.S. GOVERNMENT PRINTING OFFICE:1985—576-070 / 10034

TE DUE

PRINTED IN U.S.A.


ARMENDARIS
GRANT
FRA CRISTOBAL RANGE
AT & SF
Laval
Crocker
Monticello
Placitas
Winston
Chloride
Lookout Mtn
Sawmill Peak
Turkey Creek
Diamond Peak
Diamond Creek
Thumb Tank Peak
Cuchillo
Hot Springs Landing
Kettle Top Butte
ELEPHANT BUTTE RESERVOIR
SPILLWAY ELEV 4450
Engle
Elephant Butte
Hermosa
Reeds Peak
Panther Peak
Truth or Consequences
Williamsburg
Caballo Cone
Las Palomas
Cutter
McKnight Mtn
Apache Peak
Caballo
Aleman
Brushy Mtn
Oasis
SABALLO RESERVOIR
Upham
Emory Pass
Kingston
Hillsboro
Hendricks Peak
Mimbres
San Lorenzo
Arrey
Alivio
Derry
Garfield
Grama
San Juan
Sherman
Lake Valley
Salem
Hatch
Rincon
Placitas
Angostura
Swartz
Dwyer
Mule Springs Peak
Table Mtn
Taylor Mtn
Nutt
San Diego Mtn
Tonuco
Radium Springs
Leasburg
Robledo Mtn
Magdalena Pk
Florida
Fluorite Ridge
Organ
San Augustin Pass
Salinas Peak
Skillet Knob
Gunsight Peak
Black Top Mtn
Goat Mtn
Quartzite Mtn
Capitol Peak
Gyp Hills
Lumley Lake
Lake Lucero
WHITE
NATIONAL
SAN ANDRES NATIONAL WILDLIFE REFUGE
JORNADA RANGE RESERVE
SIERRA DE LAS CUCHILLAS
SIERRA DE LAS UVAS
SIERRA DE LAS CARAS
SIERRA DE LAS CUEVAS
DOÑA ANA MTS
SAN ANDRES MOUNTAINS
MIMBRES MOUNTAINS
BLACK RANGE
GUIDE MERIDIAN WEST
PRINCIPAL MERIDIAN
7½ W
1 E

WHITE SANDS RESOURCE AREA



SIERRA COUNTY

PUBLIC
STATE
PRIVATE

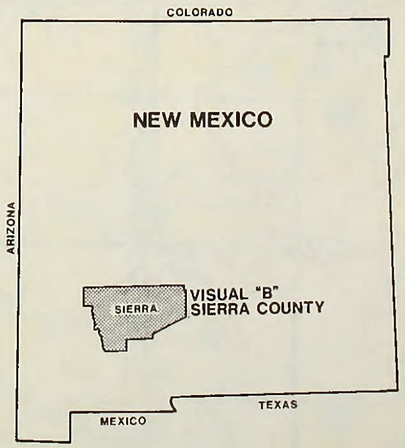
N

Scale 1:250,000

5 0 5 10 15 20 Statute Miles

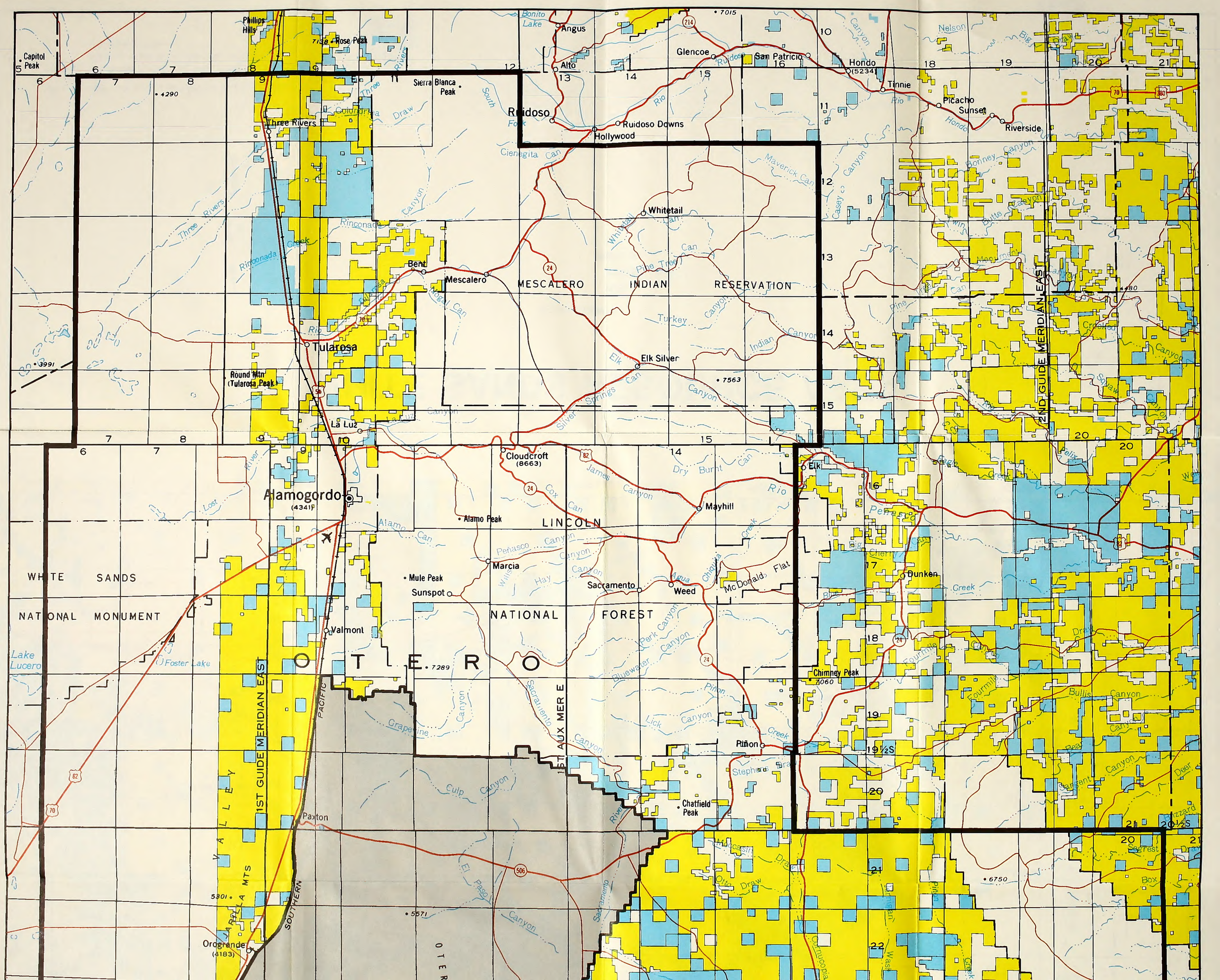
5 0 5 10 15 20 25 30 Kilometers

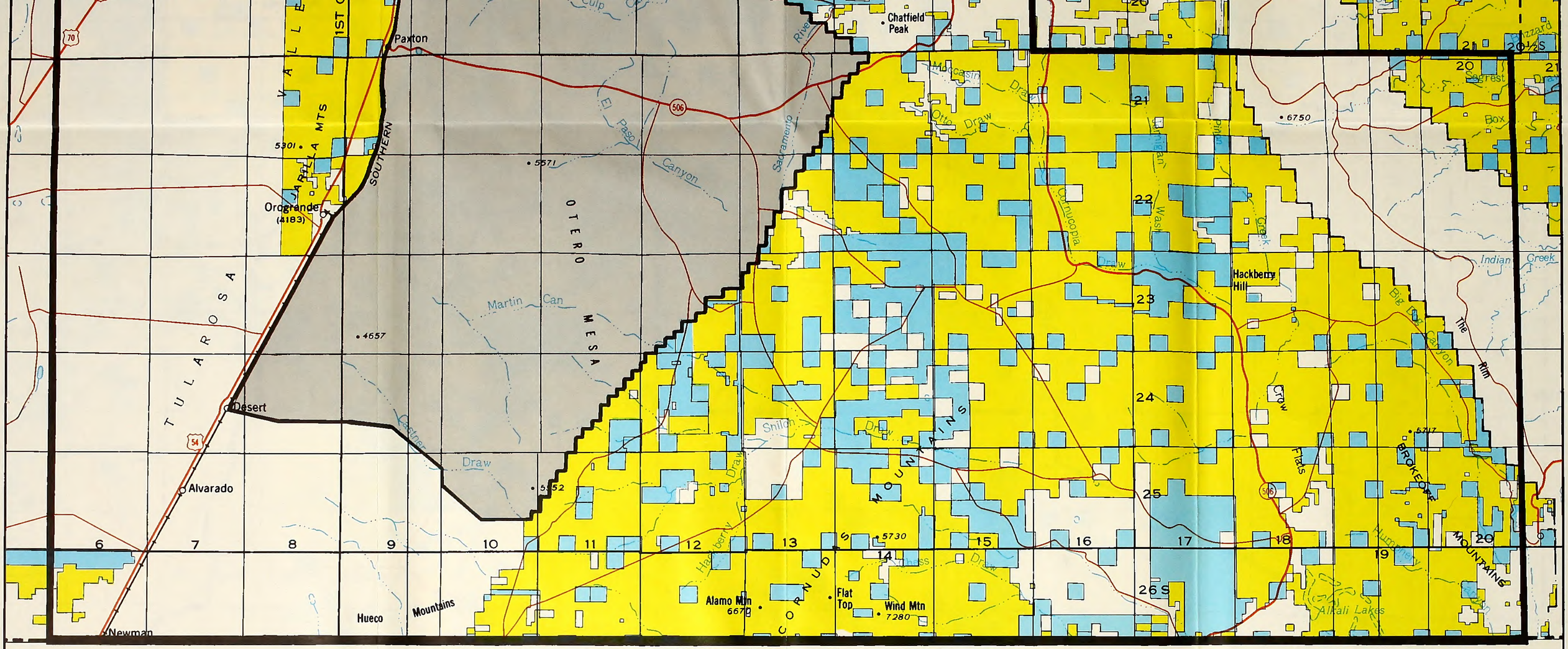
5 0 5 10 15 Nautical Miles



NOTE TO USER: This visual is NOT for legal purposes.

SOURCE: Las Cruces District Office Files. ,1984, BLM NM State Office Survey Records, 1971; and U.S. Geological Survey.


Capitol Peak
Phillips Hills
Rose Peak
Sierra Blanca Peak
Three Rivers
Ruidoso
Ruidoso Downs
Hollywood
Alto
Angus
Bonito Lake
Glencoe
San Patricio
Hondo
Tinnie
Picacho
Sunset
Riverside
Whitetail
Bent
Mescalero
MESCALERO INDIAN RESERVATION
Tularosa
Round Mtn (Tularosa Peak)
La Luz
Elk Silver
Cloudcroft (8663)
Elk
Alamogordo (4341)
Alamo Peak
LINCOLN NATIONAL FOREST
Mayhill
Marcia
Mule Peak
Sunspot
Sacramento
Weed
McDonald Flat
Dunken
WHITE SANDS NATIONAL MONUMENT
Valmont
Lake Lucero
Foster Lake
OTERO
Chimney Peak
Pinon
Chatfield Peak
Paxton
Orogrande (4183)
1ST GUIDE MERIDIAN EAST
2ND GUIDE MERIDIAN EAST
1ST AUX MER E
TULAROSA VALLEY
JARILLA MTS
SOUTHERN PACIFIC



WHITE SANDS RESOURCE AREA

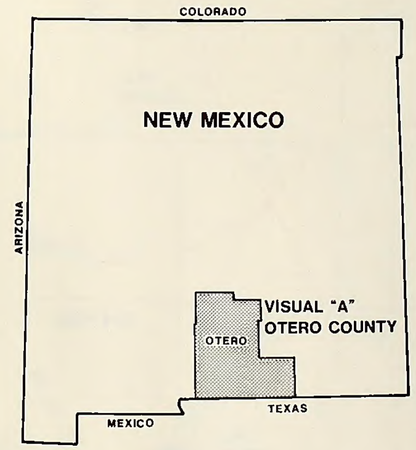
OTERO COUNTY

PUBLIC
STATE
PRIVATE
McGREGOR RANGE CO-USE AREA

N

Scale 1:250,000

5 0 5 10 15 20 Statute Miles
5 0 5 10 15 20 25 30 Kilometers
5 0 5 10 15 Nautical Miles



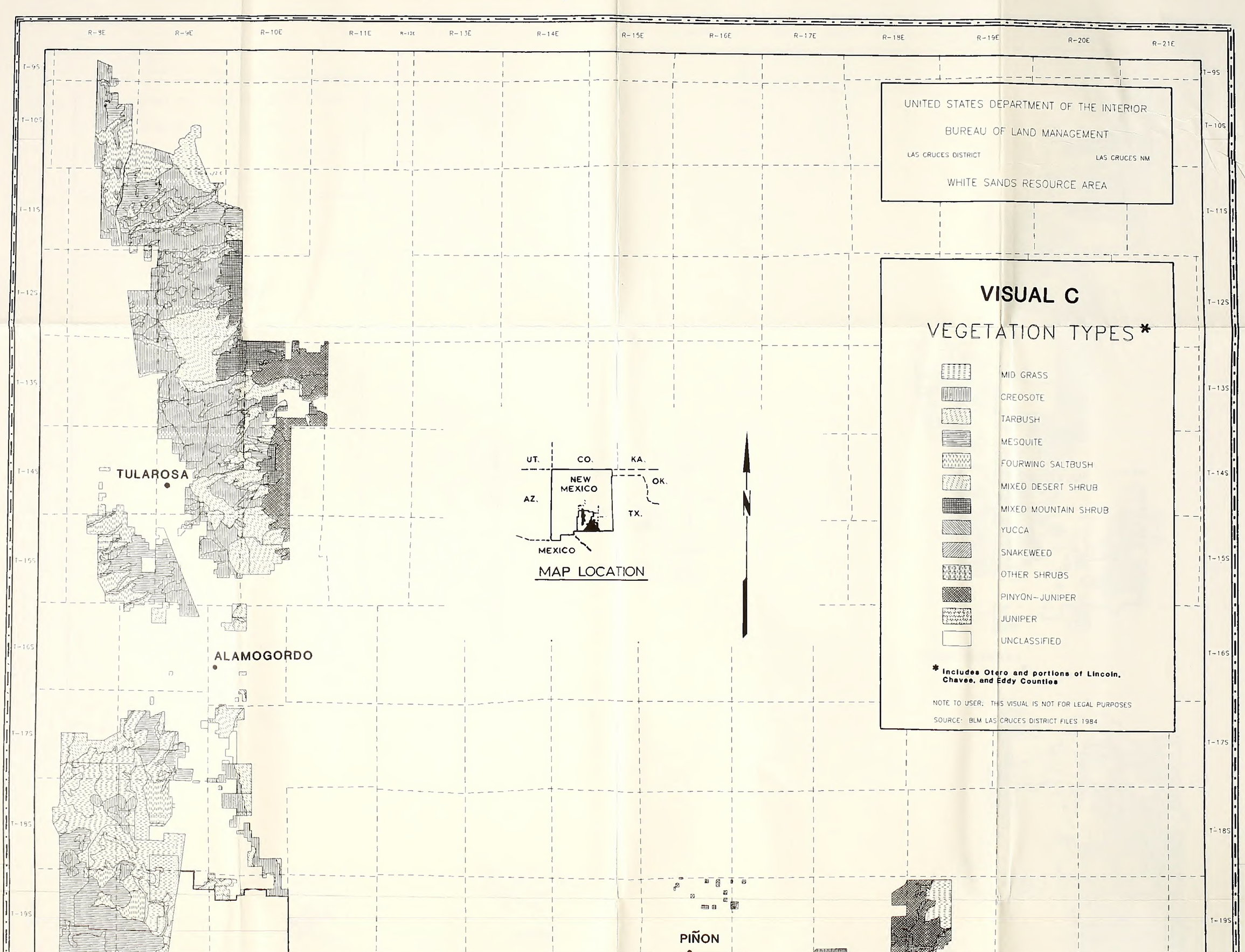
WHITE SANDS RA VISUALS
OTERO COUNTY VISUAL A
(Sierra County Visual B on Reverse Side)

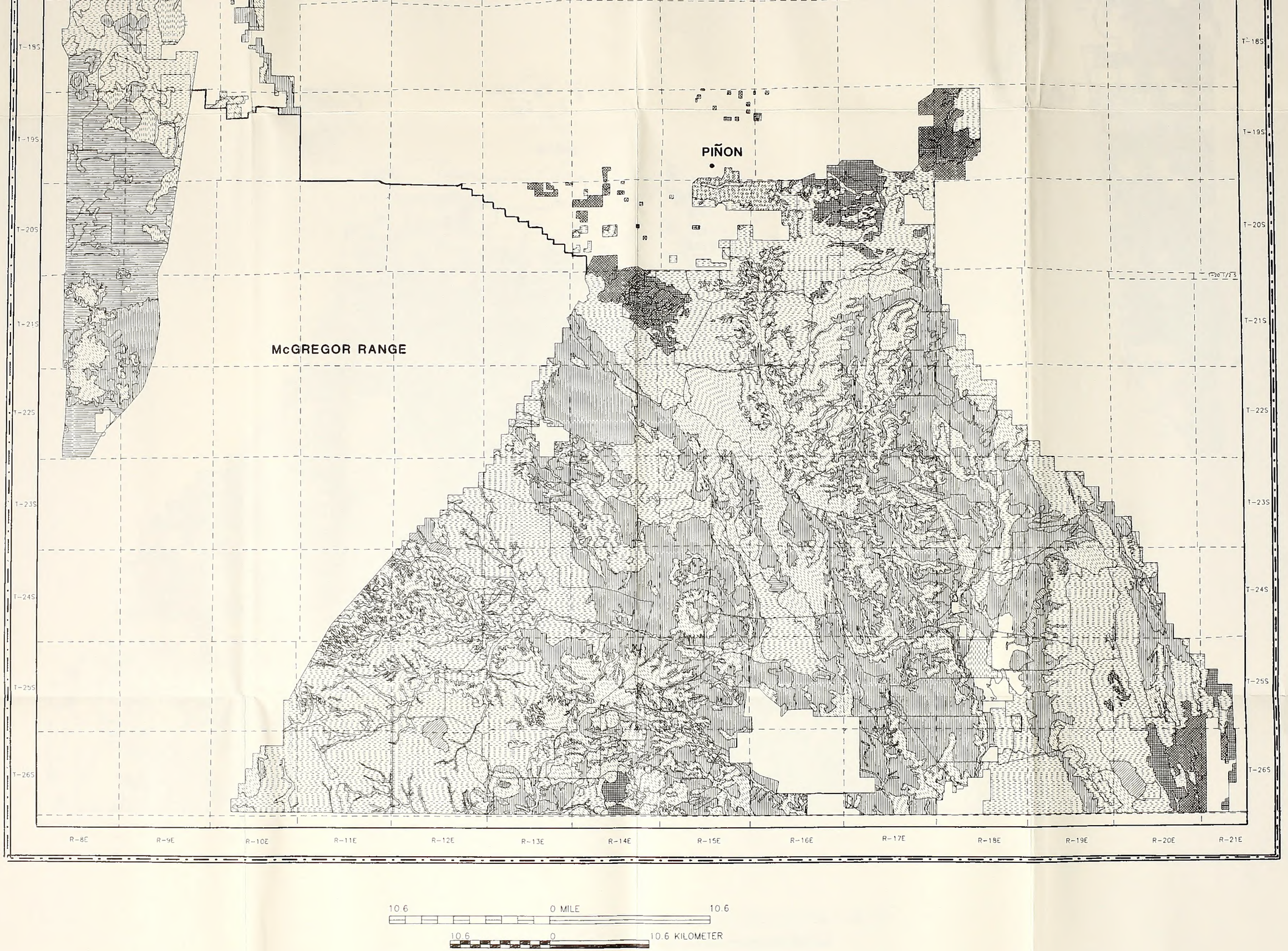
NOTE TO USER: This visual is NOT for legal purposes.

SOURCE: Las Cruces District Office Files. ,1984, BLM NM State Office Survey Records, 1971; and U.S. Geological Survey.

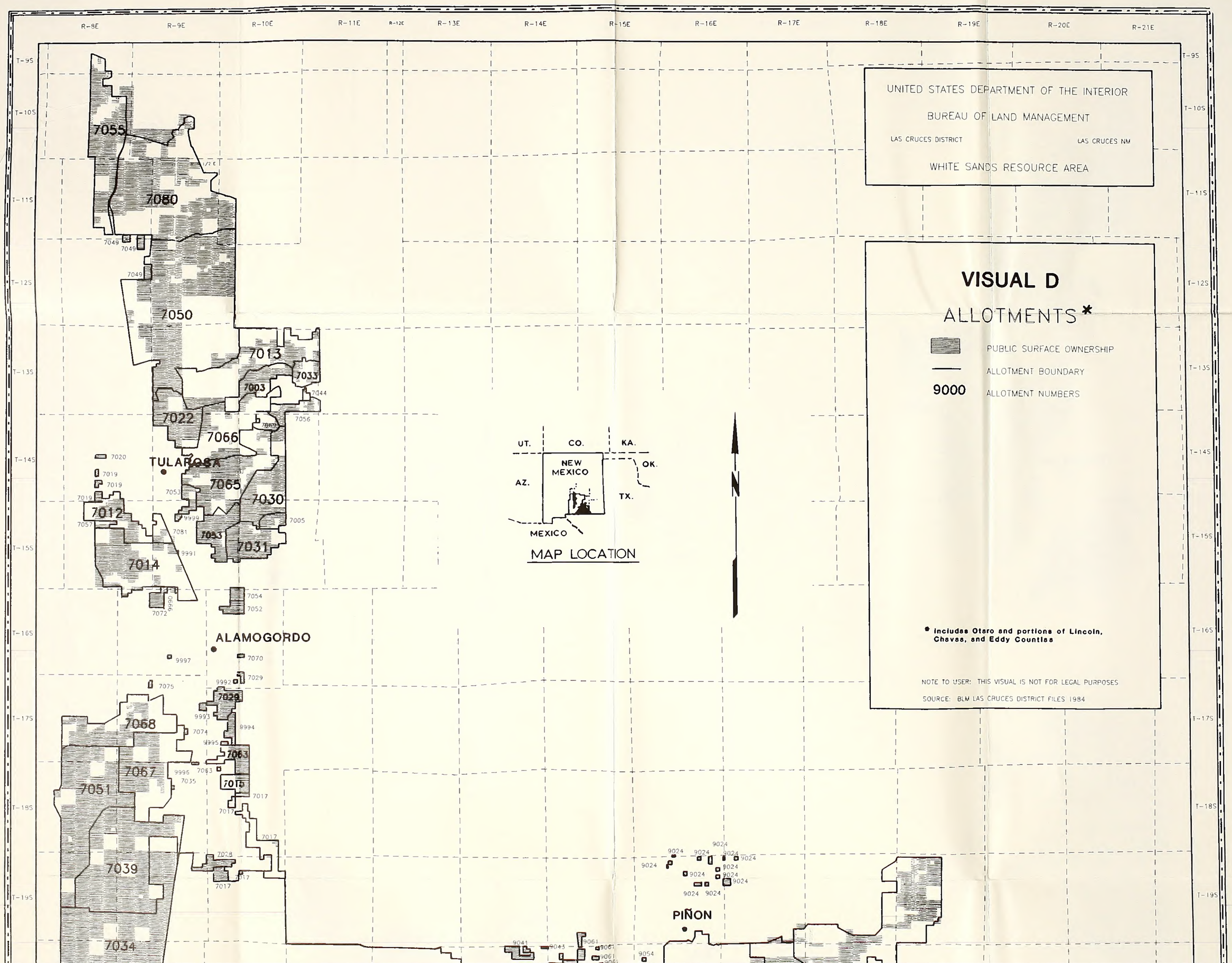
Bureau of Land Management, Las Cruces District Office
Las Cruces, New Mexico

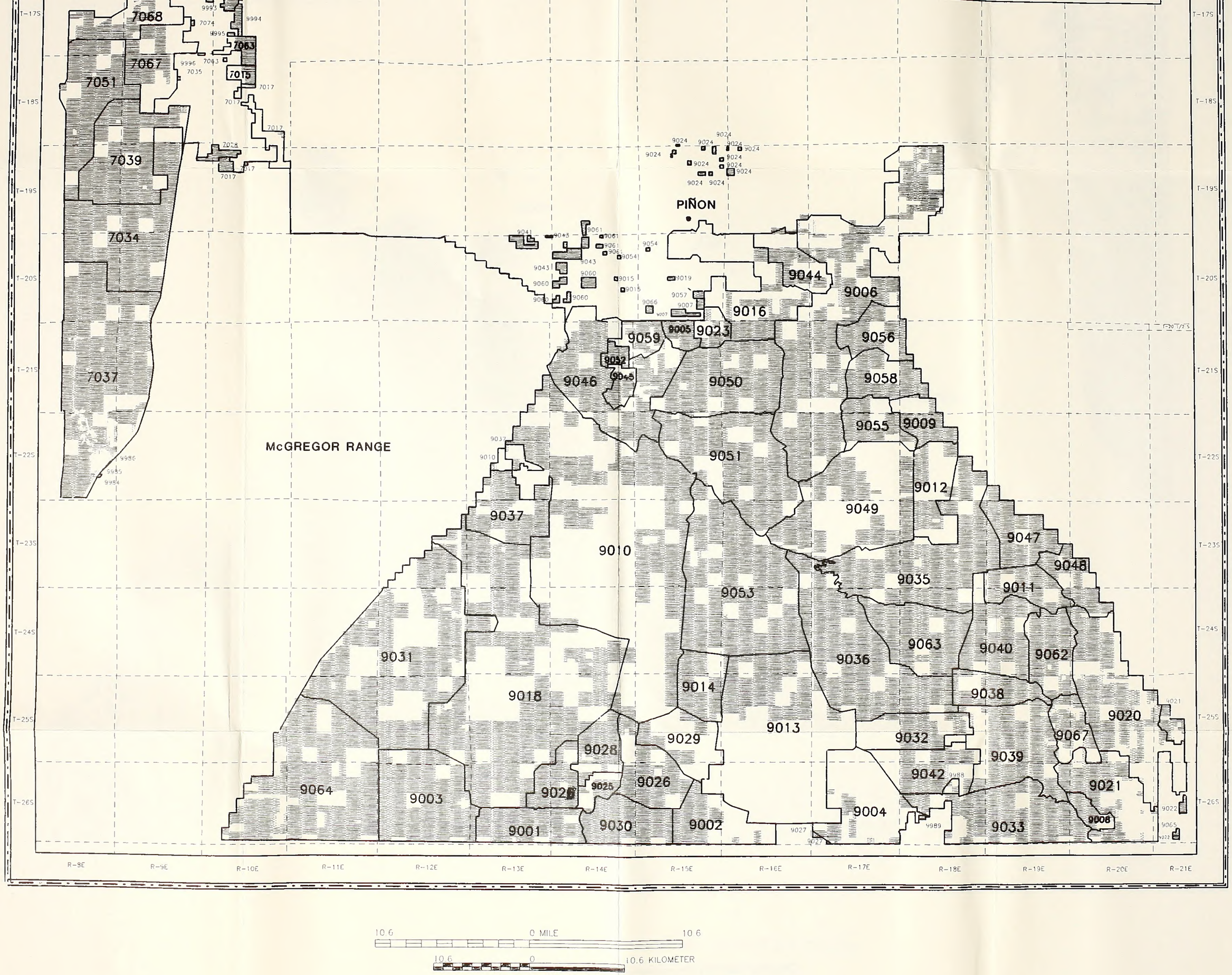
☆ U.S. GOVERNMENT PRINTING OFFICE: 1984-576-719


R-8E
R-9E
R-10E
R-11E
R-12E
R-13E
R-14E
R-15E
R-16E
R-17E
R-18E
R-19E
R-20E
R-21E
T-9S
T-10S
T-11S
T-12S
T-13S
T-14S
T-15S
T-16S
T-17S
T-18S
T-19S
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
LAS CRUCES DISTRICT
LAS CRUCES NM
WHITE SANDS RESOURCE AREA
VISUAL C
VEGETATION TYPES*
MID GRASS
CREOSOTE
TARBUSH
MESQUITE
FOURWING SALTBUSH
MIXED DESERT SHRUB
MIXED MOUNTAIN SHRUB
YUCCA
SNAKEWEED
OTHER SHRUBS
PINYON-JUNIPER
JUNIPER
UNCLASSIFIED
* Includes Otero and portions of Lincoln, Chavez, and Eddy Counties
NOTE TO USER: THIS VISUAL IS NOT FOR LEGAL PURPOSES
SOURCE: BLM LAS CRUCES DISTRICT FILES 1984
TULAROSA
ALAMOGORDO
PIÑON
UT.
CO.
KA.
OK.
AZ.
NEW MEXICO
TX.
MEXICO
MAP LOCATION
N

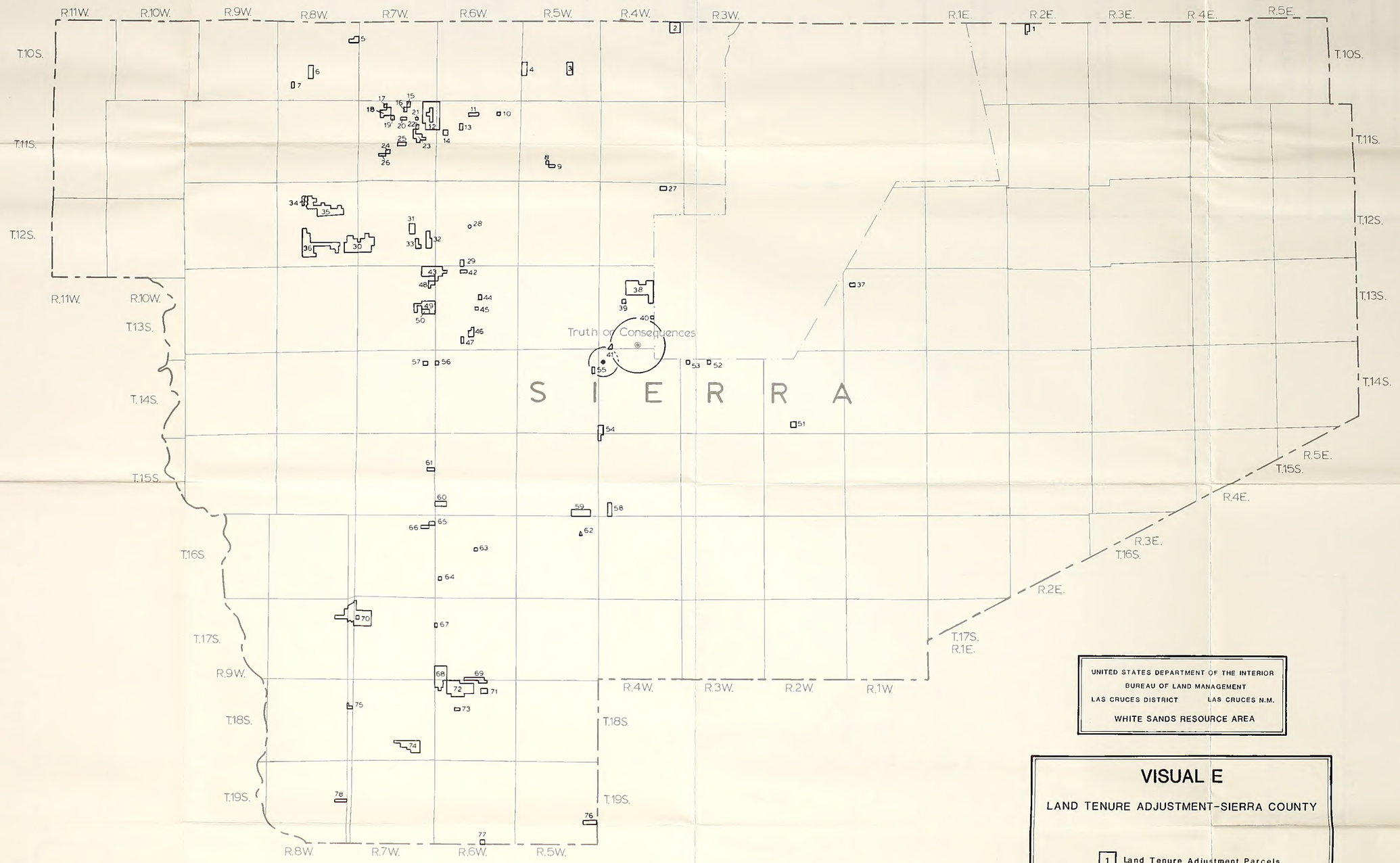


BLM – New Mexico


UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
LAS CRUCES DISTRICT
LAS CRUCES NM
WHITE SANDS RESOURCE AREA
VISUAL D
ALLOTMENTS*
PUBLIC SURFACE OWNERSHIP
ALLOTMENT BOUNDARY
9000 ALLOTMENT NUMBERS
* Includes Otero and portions of Lincoln, Chaves, and Eddy Counties
NOTE TO USER: THIS VISUAL IS NOT FOR LEGAL PURPOSES
SOURCE: BLM LAS CRUCES DISTRICT FILES 1984
MAP LOCATION
UT.
CO.
KA.
OK.
AZ.
NEW MEXICO
TX.
MEXICO
N
TULAROSA
ALAMOGORDO
PIÑON
7055
7080
7050
7013
7033
7003
7022
7066
7065
7030
7012
7014
7031
7068
7067
7051
7039
7034
7015
7063
R-8E
R-9E
R-10E
R-11E
R-13E
R-14E
R-15E
R-16E
R-17E
R-18E
R-19E
R-20E
R-21E
T-9S
T-10S
T-11S
T-12S
T-13S
T-14S
T-15S
T-16S
T-17S
T-18S
T-19S



BLM – New Mexico



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
LAS CRUCES DISTRICT LAS CRUCES N.M.
WHITE SANDS RESOURCE AREA

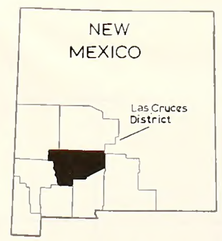
VISUAL E

LAND TENURE ADJUSTMENT-SIERRA COUNTY

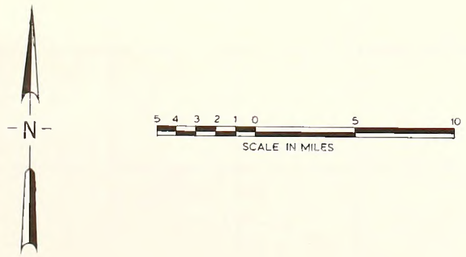
1 Land Tenure Adjustment Parcels (Numbers correspond to information contained in Appendix A.)

○ Public land within each circle has been identified as available for disposal to meet needs for community expansion and public purposes.

SOURCE: BLM Las Cruces District Office Files,1984



MAP LOCATION



NOTE: Appendix A of the White Sands RMP/EIS contains additional information on the parcels shown on this visual.

NOTE TO USER: This Visual Not For Legal Purposes.

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

LAS CRUCES DISTRICT LAS CRUCES N.M.

WHITE SANDS RESOURCE AREA

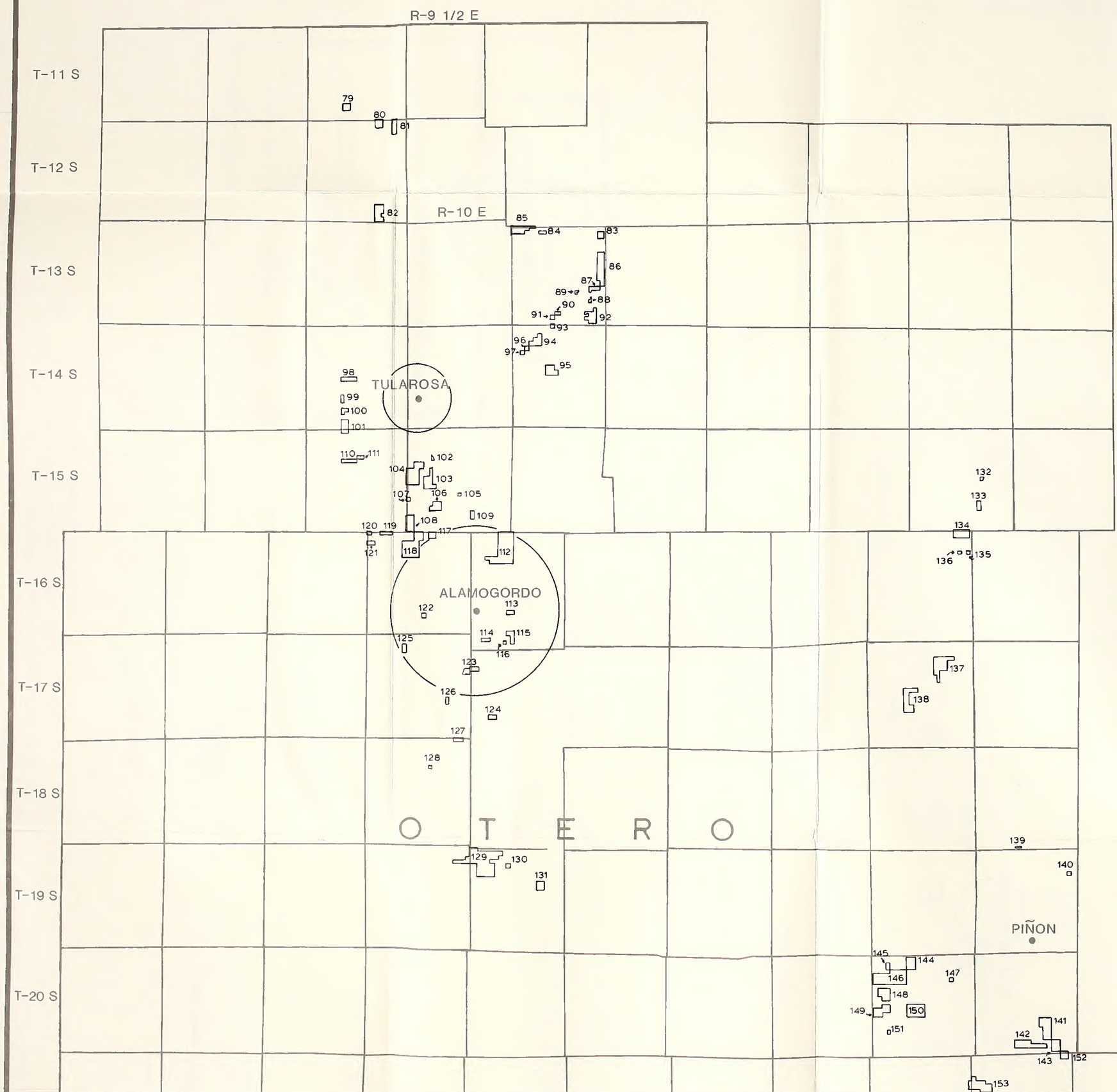
VISUAL F

LAND TENURE ADJUSTMENT-OTERO COUNTY

79 Land Tenure Adjustment Parcels (Numbers correspond to information contained in Appendix A.)

Public land within each circle has been identified as available for disposal to meet needs for community expansion and public purposes.

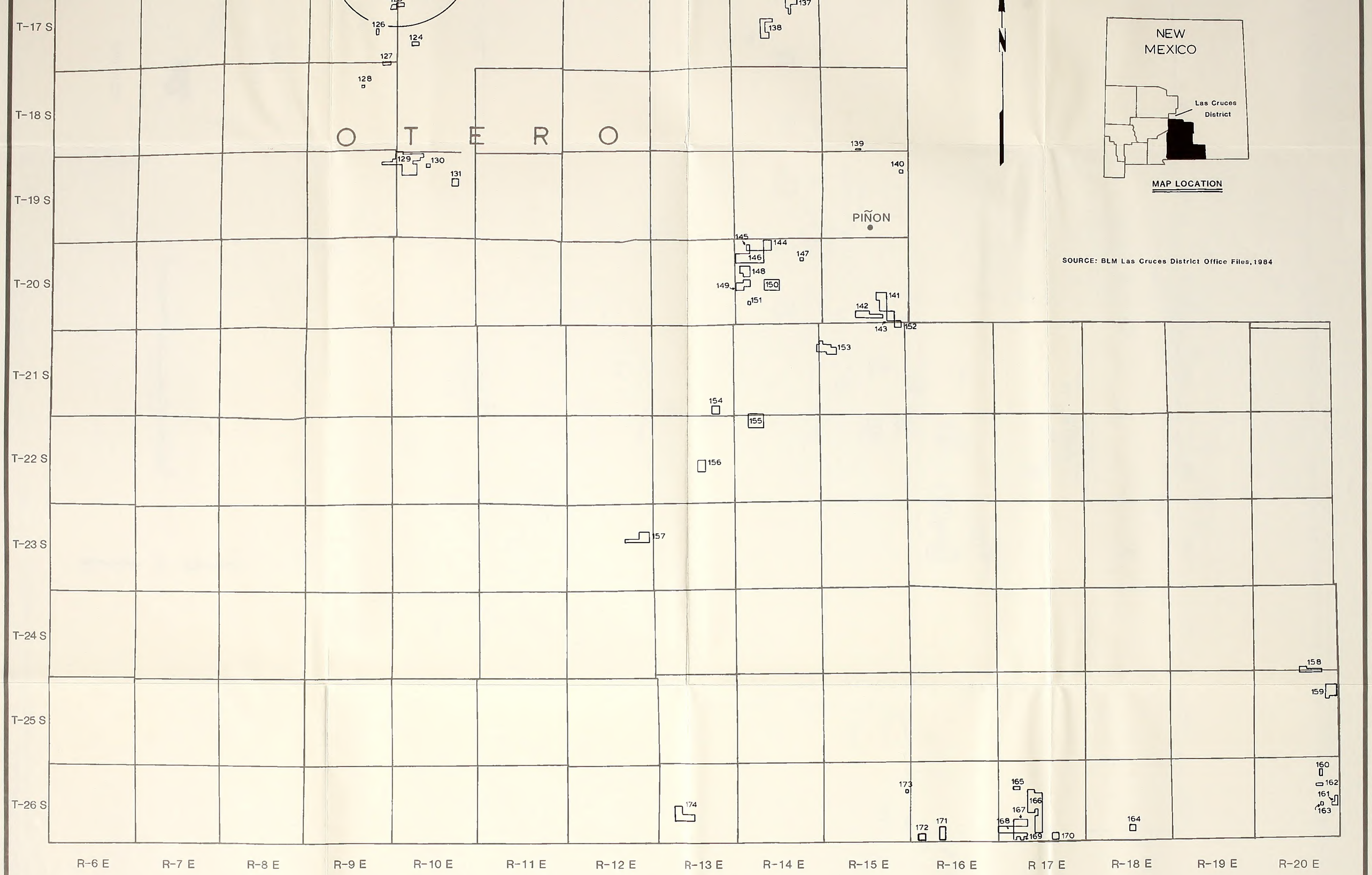
NOTE: Appendix A of the White Sands RMP/EIS contains additional information on the parcels shown on this visual.



SCALE: 1/4" = 1 MILE

MAP LOCATION

SOURCE: BLM Las Cruces District Office Files, 1984



SOURCE: BLM Las Cruces District Office Files, 1984

NOTE TO USER: This Visual Not For Legal Purposes.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

P.O. Box 1420
Las Cruces, New Mexico 88004

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

POSTAGE AND FEES PAID
DEPARTMENT OF THE INTERIOR
INT415

U.S. MAIL